

AD-A044 157

OFFICE OF THE COMPTROLLER OF THE ARMY WASHINGTON D C --ETC F/6 14/1
ARMY LIFE CYCLE COST MODEL FOR TRACKED VEHICLE SYSTEMS, (U)
JUL 77 M J MARRONE, W S CLOUGH, E H MILER

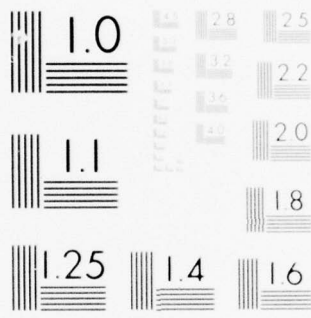
UNCLASSIFIED

DCA-R-50

NL

1 OF 2
AD
A044157





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

AD 90 44/57

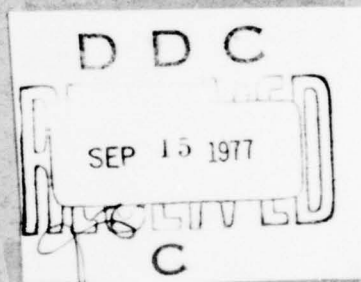
①

ARMY LIFE CYCLE COST MODEL

FOR

TRACKED VEHICLE SYSTEMS

REPORT DCA-R-50



Mr. Michael J. Marrone

LTC William S. Clough

LTC Edward H. Miler

July 1977

DISTRIBUTION STATEMENT A

Approved for public release
Distribution Unlimited

SYSTEM ESTIMATES DIVISION

DIRECTORATE OF COST ANALYSIS ✓

OFFICE OF THE COMPTROLLER OF THE ARMY

TABLE OF CONTENTS

FOREWORD		ii
LIST OF FIGURES		iii
LIST OF TABLES		iv
CHAPTERS		
1	INTRODUCTION	1
	Purpose	1
	Objectives	1
	Scope	1
	Organization	1
	Limitations	2
2	DESCRIPTION OF THE GENERIC TRACKED VEHICLE COST MODEL	3
	General	3
	Relationship to Army Life Cycle Cost Model (ALCCM)	3
	Research and Development Phase	5
	Investment Phase	7
	Operating and Support Phase	10
3	COMPUTER IMPLEMENTATION OF THE TRACKED VEHICLE COST MODEL	13
	General	13
	Relationship to Army Life Cycle Cost Model	13
	Tracked Vehicle Life Cycle Cost Model	13
APPENDICES		
1	Tracked Vehicle Life Cycle Cost Model Documentation	15.1
2	References	124

ACCESS	
NTIS	✓
DOC	
UNCLASSIFIED	
JUSTICE	
<i>per ltr on file.</i>	
BY	
DISTRIBUTION/AVAILABILITY CODES	
Dist	SPECIAL
A	

FOREWORD

1. The Army Life Cycle Cost Model for Tracked Vehicle Systems describes the methodology and rationale used by the System Estimates Division, Directorate of Cost Analysis, Comptroller of the Army, for developing an estimate for all or part of the life cycle cost of a tactical tracked vehicle weapon system.
2. The model is intended for use by cost analysts. It reflects current doctrine of the Directorate of Cost Analysis for Independent Parametric Cost Estimates. Updates to this document will be made periodically as revisions or additions to the methodology are made. The data base which supports the variables shown in the various equations throughout the model is published separately and is on file at the Directorate of Cost Analysis.
3. Inquiries concerning this effort should be referred to HQDA, DACA-CAS, the Pentagon, Washington, DC 20310, AUTOWON 225-1104.

LIST OF FIGURES

FIGURE		PAGE
1	Army Life Cycle Cost Matrix	6
2	Modifications to the Army Life Cycle Cost Model for Tracked Vehicle Usage	14

LIST OF TABLES

TABLE		PAGE
1	Summary Sheet - Tracked Vehicle Cost Model Methodology	4
2	Tracked Vehicle Life Cycle Cost Model Reports	15

CHAPTER 1

INTRODUCTION

1. Purpose. The Army Life Cycle Cost Model for Tracked Vehicle Systems provides a framework in terms of cost elements and system structure to develop a life cycle Independent Parametric Cost Estimate (IPCE) for a tactical tracked vehicle system. The cost model provides the equations which estimate the cost of Research and Development, Investment, and Operating and Support phases of a tracked vehicle system. This model conforms to and is a derivative of the Army Life Cycle Cost Model (ALICM), Reference 6.

2. Objectives. The major objectives of this model are:

a. To document the methodology and rationale which is currently being used for independent parametric cost estimating of tracked vehicle systems as prescribed by AR 11-18.

b. To provide cost analysts with the means to calculate the life cycle cost of a tracked vehicle system.

3. Scope. The following items are provided in this cost model:

a. The framework, or cost matrix of the model in terms of cost elements (rows) and system structure (columns).

b. Identification of the cost cells which are currently used and a description of all current equations on a cell-by-cell basis that are used to calculate life cycle costs.

c. An introduction to the automated version of the tracked vehicle cost model.

d. Documentation of the generic tracked vehicle model through the use of cost data sheets.

4. Organization.

a. The description of this cost model is designed to "stand alone" in the sense that all equations, methodology and rationale are presented. The user need only supply input data for the variables he chooses to use based on his unique requirements in order to use the cost model.

b. Chapter 2 describes in detail the tracked vehicle matrix, identifies the cells which are currently active, and provides the cost estimating equations for calculating the life cycle cost. Detailed definitions for the cost elements and system structure are provided as follows:

- (1) R&D Cost Elements & System Structure -- DA PAM 11-2.
- (2) Investment Cost Elements & System Structure -- DA PAM 11-3.
- (3) O&S Cost Elements & System Structure -- DA PAM 11-4.

c. The automated version of the tracked vehicle cost model is called the Tracked Vehicle Life Cycle Cost Model (TVLCCM). The TVLCCM is briefly described in Chapter 3. TVLCCM sample output reports and the TVLCCM's adaptation from the Army Life Cycle Cost Model are also described in this chapter.

d. The cost equations described in Chapter 2 provide the essentials for calculating a constant dollar (FY 19xx) life cycle cost. More detailed information concerning the methodology is described on the Cost Data Sheets in Appendix 1.

e. The analysis of cost estimates requires that the estimate be displayed in several different formats. In addition to the constant dollar display, a shift to a different base year or a display by appropriation account or current dollars may be desired. Because of the need for such different displays, in addition to assuring speed and accuracy, an automated cost model is a necessity.

5. Limitations. This document is an adaptation of the Army Life Cycle Cost Model (ALCCM). Complete listings of the computer program and various associated input files is beyond the scope of this effort and would be redundant. Only the changes from the ALCCM to tune to tracked vehicles is presented. The computer version of the ALCCM is fully documented in DCA-R-15, January 1976, Reference 6.

CHAPTER 2

DESCRIPTION OF THE GENERIC TRACKED VEHICLE COST MODEL

1. General. This chapter describes the Army Life Cycle Cost Matrix adapted to tracked vehicle systems, identifies the cells which are currently active, and provides the generic equations for calculating life cycle costs.

2. Relationship to Army Life Cycle Cost Matrix.

a. The Army Life Cycle Cost Matrix best illustrates the framework of the Army Life Cycle Cost Model. The matrix is composed of cost elements (rows) and system structure (columns). It is used to insure that total relevant life cycle cost is captured and any duplication (double counting) is avoided.

b. The adaption of the Army Life Cycle Cost Matrix to tracked vehicle systems is shown in Figure 1. The cost elements and system structure intersect at cost cells. Ideally, a parametric relationship should be developed for every cell. However, limitations on data available preclude estimating all cells at this time. The cells marked with an "x" identify the active cells of the tracked vehicle model. There are currently 104 active cells in the model. Despite the use of a smaller number of cells than are available, the discipline of capturing 100 per cent of life cycle cost is maintained.

c. The active cell cost estimates fall into three general categories; cost estimating relationships (CERs), cost factors, and thruputs.

(1) Cost estimating relationships have been developed for recurring production (frame, communications, propulsion, fire control, armament, and ammunition), depot maintenance (labor), POL, and replenishment spares (frame, engine and armament).

(2) Cost factors are used to estimate system test and evaluation, initial spares and repair parts, transportation, system/project management, military personnel, consumption, depot maintenance (materiel and transportation), modifications, and direct and indirect support operations.

TRACK VEHICLE ACTIVE CELLS

ITEM NO.	FORM APPROV	SYSTEM STRUCTURE*	COST ELEMENT	(1) FRAME	(2) PERSONNEL	(3) COMMUNICATIONS	(4) FIRE CONTROL	(5) ARMAMENT	(6) PARTIAL AMBUSHMENT	(7) OTHER	(8) COMBAT SUPPORT EQUIPMENT	(9) SPECIAL SUPPORT EQUIPMENT	(10) TOTAL	(11) PERCENT
1	NOTE 1.0	RESEARCH AND DEVELOPMENT												
2	NOTE 1.01	RESEARCH AND DEVELOPMENT												
3	NOTE 1.02	PRODUCTIVITY ENGINEERING AND PLANNING (PEP)												
4	NOTE 1.03	TOOLING												
5	NOTE 1.04	PROTOTYPE MANUFACTURING												
6	NOTE 1.05	DATA												
7	NOTE 1.06	SYSTEM TEST AND EVALUATION												
8	RD/OM 1.07	SYSTEM/PROJECT MANAGEMENT												
9	RD/OM 1.08	TRAINING												
10	RD/OM 1.09	FACILITIES												
11	NOTE 1.10	OTHER												
12	2.0	INVESTMENT												
13	PR/MC 2.01	NON RECURRING INVESTMENT												
14	PR/MC 2.02	PRODUCTION												
15	PR/MC 2.03	ENGINEERING CHARGES												
16	PR/MC 2.04	SYSTEM TEST AND EVALUATION												
17	PR/MC 2.05	DATA												
18	PR/MC 2.06	SYSTEM/PROJECT MANAGEMENT												
19	PR/MC 2.07	OPERATIONAL/SITE ACTIVATION												
20	PR/MC 2.08	TRAINING												
21	PR/MC 2.09	INITIAL SPARES AND REPAIR PARTS												
22	PR/MC 2.10	TRANSPORTATION												
23	PR/MC 2.11	OTHER												
24	3.0	OPERATING AND SUPPORT COST												
25	3.01	MILITARY PERSONNEL												
26	MPA 3.011	CREW PAY AND ALLOWANCES												
27	MPA 3.012	MAINTENANCE PAY AND ALLOWANCES												
28	MPA 3.013	INDIRECT PAY AND ALLOWANCES												
29	MPA 3.014	PERMANENT CHANGE OF STATION												
30	3.02	CONSUMPTION												
31	PR/OM 3.021	REPLENISHMENT SPARES												
32	OMA 3.022	PETROLEUM, OIL AND LUBRICANTS												
33	PR/OC 3.023	UNIT TRAINING, AMMUNITION AND MISSILES												
34	3.03	DEPOT MAINTENANCE												
35	OMA 3.031	LABOR												
36	PR/OM 3.032	MATERIAL												
37	OMA 3.033	TRANSPORTATION												
38	PR/OC 3.04	MODIFICATIONS, MATERIAL												
39	3.05	OTHER DIRECT SUPPORT OPERATIONS												
40	OMA 3.051	MAINTENANCE, CIVILIAN LABOR												
41	OMA 3.052	OTHER DIRECT												
42	3.06	INDIRECT SUPPORT OPERATIONS												
43	MP/OM 3.061	PERSONNEL REPLACEMENT												
44	MPA 3.062	TRANSIENTS, PATIENTS AND PRISONERS												
45	OMA 3.063	QUARTERS, MAINTENANCE AND UTILITIES												
46	MP/OM 3.064	MEDICAL SUPPORT												
47	OMA 3.065	OTHER INDIRECT												
48		TOTAL SYSTEM COST (LESS ERDA)												
49	ERDA 4.0	ERDA COST												
50		TOTAL SYSTEM COST (WITH ERDA)												

FIGURE 1

*THE COLUMN HEADINGS SHOWN ARE GENERAL. USED FOR DISCUSSION OF SYSTEMS IN GENERAL FOR SPECIFIC STUDY. SPECIFIC COLUMN HEADINGS ARE THOSE PROVIDED IN APPENDIX 2.

**USED FOR A SPECIFIC HARDWARE COMPONENT/SUBSYSTEM OF HIGH MANAGEMENT INTEREST. NOT CAPTURED ELSEWHERE.

(3) Thruputs are used to complete the estimate including any additional cells of the Investment Phase and Operating and Support Phase, the Research and Development Phase, non-recurring investment, data, training, and production (other).

d. A summary of the methodology used in each active cell is described in Table 1. The following sections describe in detail each active tracked vehicle cost cell by life cycle phase. The intent of the remainder of this chapter is to provide the essential information to calculate a tracked vehicle system life cycle cost. A full description of the active cells is documented by the Cost Data Sheets in Appendix 1.

3. Research and Development (R&D) Phase.

a. General. Guidance for estimating R&D costs is contained in DA Pamphlet 11-2, Research and Development Cost Guide for Army Materiel Systems. Eleven cost cells of the Tracked Vehicle Cost Model are active in this phase. Most cells are costed as thruputs because cost data is unavailable at a detailed level for parametric estimating.

b. Development Engineering (1.01,7). This cell contains the costs incurred during study, analysis, design, development, evaluation, testing, and redesign for the tracked vehicle system during the development effort.

c. Producibility, Engineering and Planning (PEP) (1.02,7). This cell contains cost incurred in assuring the producibility of the developmental tracked vehicle weapon system. PEP includes efforts related to development of the Technical Data Package (TDP), Quality Assurance (QA) plans, and special production processes to assess producibility.

d. Tooling (1.02,7). This cell contains the planning, design, fabrication, assembly, installation, modification, maintenance and rework of all tools, inspection equipment, and test equipment supporting the development of the tracked vehicle system.

e. Prototype Manufacturing (1.04,7). This cell contains the cost of fabrication, processing, subassembly, final assembly, reworking modification, and installation of parts and equipment for the tracked vehicle.

f. Data (1.05,7). This cell contains the cost of gathering, storing, reproducing, and disseminating data throughout the R&D phase.

TABLE 1

TRACKED VEHICLE COST MODEL METHODOLOGY

DEFN REF	COST ELEMENT/SYS STRUCTURE	GENERAL EQUATION	NOTES
1.0	Research and Development	Sum of Following	
1.01,7	Dev Engr, Other TV	$C = (Q_{my}) * (AC_{my}) + (TP)$	
1.02,7	Prod, Engr, and Planning (PEP)	$C = (TP)$	
1.03,7	Tooling, TV	$C = (TP)$	
1.04,7	Prototype Manufacturing	$C = (Q_{ptp}) * (AC_{ptp}) + (TP)$	
1.05,7	Data	$C = (TP)$	
1.06,7	System Test and Evaluation	$C = (Q_t) * (AC_t) + (TP)$	
1.07,7	System/Project Mgmt	$C = (Q_{my}) * (AC_{gmy}) + (Q_{my}) * (AC_{cmy}) + (TP)$	
1.08,7	Training	$C = (Q_{my}) * (AC_{my}) + (Q_{tsets}) * (AC_{tsets}) + (TP)$	
1.09,7	Facilities	$C = (TP)$	
1.10,7	Other, TV, TBS	$C = (TP)$	
1.10,10	Other, Other	$C = (TP)$	includes all sunk \$
2.0	Investment	Sum of Following	
2.01,7	Non-Recurring Invest	$C = (TP)$	
2.02,1	Production, Frame	$C = (C_{eng}) + ((UC_{1st}) * (Q_{mfg}) ** (B) * (Q_{mfg}))$	
2.02,2	Production, Propulsion	$C = ((C_{eng}) + ((UC_{1st}) * (Q_{mfg}) ** (B) * (Q_{mfg}))) + ((C_{eng}) + ((UC_{1st}) * (Q_{mfg}) ** (B) * (Q_{mfg})))$	Engine plus Transmission
2.02,3	Production, Comm	$C = (Q_{comm}) * (AC_{comm})$	
2.02,4	Production, Fire Control	$C = (C_{eng}) + ((UC_{1st}) * (Q_{mfg}) ** (B) * (Q_{mfg}))$	
2.02,5	Production, Armament	$C = (C_{eng}) + ((UC_{1st}) * (Q_{mfg}) ** (B) * (Q_{mfg}))$	
2.02,6	Production, Ammunition	$C = (C_{eng}) + ((UC_{1st}) * (Q_{mfg}) ** (B) * (Q_{mfg}))$	
2.02,7	Production, Other	$C = (TP)$	
2.02,8	Production, Pec Spt Eq	$C = (TP)$	
2.02,9	Production, Comn Spt Eq	$C = (TP)$	
2.03,1	Engr Changes, Frame	$C = (\%) * (C_{prod})$	Incl in 2.02,1
2.03,2	Engr Changes, Propulsion	$C = (\%) * (C_{prod})$	
2.03,3	Engr Changes, Commo	$C = (\%) * (C_{prod})$	
2.03,4	Engr Changes, Fire Contr	$C = (\%) * (C_{prod})$	
2.03,5	Engr Changes, Armament	$C = (\%) * (C_{prod})$	
2.03,6	Engr Changes, Ammo	$C = (\%) * (C_{prod})$	
2.03,7	Engr Changes, Other	$C = (\%) * (C_{prod})$	
2.03,8	Engr Changes, Pec Spt Eq	$C = (\%) * (C_{prod})$	
2.03,9	Engr Changes, Comn Spt Eq	$C = (\%) * (C_{prod})$	
2.04,7	System Test and Evaluation	$C = (Q_{tpds}) * (AC_{tpds})$	
2.05,7	Data	$C = (TP)$	

TABLE 1

TRACKED VEHICLE COST MODEL METHODOLOGY

<u>COST ELEMENT/SYS STRUCTURE</u>	<u>GENERAL EQUATION</u>	<u>NOTES</u>	<u>LEGEND</u>
Research and Development	Sum of Following		A
Dev Engr, Other TV	$C = (Q_{my}) * (AC_{my}) + (TP)$		AC = average cost
Prod, Engr, and Planning (PEP)	$C = (TP)$		acty = activity per year
Tooling, TV	$C = (TP)$		att = attrition rate
Prototype Manufacturing	$C = (Q_{ptp}) * (AC_{ptp}) + (TP)$		
Data	$C = (TP)$		B
System Test and Evaluation	$C = (Q_t) * (AC_t) + (TP)$		B = improvement curve slope, log-linear avg curve
System/Project Mgmt	$C = (Q_{my}) * (AC_{gmy}) + (Q_{my}) * (AC_{cmy}) + (TP)$		
Training	$C = (Q_{my}) * (AC_{my}) + (Q_{tsets}) * (AC_{tsets}) + (TP)$		
Facilities	$C = (TP)$		C
Other, TV, TBS	$C = (TP)$		C = cost
Other, Other	$C = (TP)$	includes all sunk \$	cmy = contractor manyears comm = communications crew = men per veh
Investment	Sum of Following		
Non-Recurring Invest	$C = (TP)$		
Production, Frame	$C = (C_{eng}) + ((UC_{1st}) * (Q_{mfg}) ** (B) * (Q_{mfg}))$		D
Production, Propulsion	$C = ((C_{eng}) + ((UC_{1st}) * (Q_{mfg}) ** (B) * (Q_{mfg}))) + ((C_{eng}) + ((UC_{1st}) * (Q_{mfg}) ** (B) * (Q_{mfg})))$	Engine plus Transmission	D = distance dest = destination
Production, Comm	$C = (Q_{comm}) * (AC_{comm})$		
Production, Fire Control	$C = (C_{eng}) + ((UC_{1st}) * (Q_{mfg}) ** (B) * (Q_{mfg}))$		E
Production, Armament	$C = (C_{eng}) + ((UC_{1st}) * (Q_{mfg}) ** (B) * (Q_{mfg}))$		eq = equipment
Production, Ammunition	$C = (C_{eng}) + ((UC_{1st}) * (Q_{mfg}) ** (B) * (Q_{mfg}))$		eng = recurring engineering costs (% of manufacturing costs)
Production, Other	$C = (TP)$		
Production, Pec Spt Eq	$C = (TP)$		
Production, Comn Spt Eq	$C = (TP)$		F
Engr Changes, Frame	$C = (\%) * (C_{prod})$	Incl in 2.02,1	f = frame
Engr Changes, Propulsion	$C = (\%) * (C_{prod})$		FREQ = frequency per year
Engr Changes, Commo	$C = (\%) * (C_{prod})$		
Engr Changes, Fire Contr	$C = (\%) * (C_{prod})$		G
Engr Changes, Armament	$C = (\%) * (C_{prod})$		gmy = govt manyears
Engr Changes, Ammo	$C = (\%) * (C_{prod})$		
Engr Changes, Other	$C = (\%) * (C_{prod})$		H
Engr Changes, Pec Spt Eq	$C = (\%) * (C_{prod})$		
Engr Changes, Comn Spt Eq	$C = (\%) * (C_{prod})$		I
System Test and Evaluation	$C = (Q_{tpds}) * (AC_{tpds})$		ind = indirect personnel
Data	$C = (TP)$		indir = indirect
System/Project Mgmt	$C = (Q_{my}) * (AC_{gmy}) + (Q_{my}) * (AC_{cmy})$		
ENL/Site Activation	$C = (TP)$		J

2.03,8	Engr Changes, Pec Spt Eq	$C = (\%) * (C_{prod})$		
2.03,9	Engr Changes, Cmn Spt Eq	$C = (\%) * (C_{prod})$		I
2.04,7	System Test and Evaluation	$C = (Q_{tpds}) * (AC_{tpds})$		ind
2.05,7	Data	$C = (TP)$		ind
2.06,7	System/Project Mgmt	$C = (Q_{my}) * (AC_{gmy}) + (Q_{my}) * (AC_{cmy})$		
2.07,7	OPNL/Site Activation	$C = (TP)$		J
2.08,7	Training	$C = (Q_{svcs} + sets + spares) * (AC_{my})$		
2.09,1	Init Sprs & Rpr Parts, Frame	$C = (\%) * (C_{prod})$		K
2.09,2	" " " " , Propulsion	$C = (\%) * (C_{prod})$		
2.09,3	" " " " , Commo	$C = (\%) * (C_{prod})$		L
2.09,4	" " " " , Fire Contr	$C = (\%) * (C_{prod})$		
2.09,5	" " " " , Armament	$C = (\%) * (C_{prod})$		M
2.09,6	" " " " , Ammo	$C = (\%) * (C_{prod})$		my =
2.09,7	" " " " , Other	$C = (\%) * (C_{prod})$		mfg =
2.09,8-9	" " " " , Spt Eq	$C = (\%) * (C_{prod})$		mi =
2.10,7	Transportation, Other	$C = (Q_{prod}) * (AC_{dest})$		main
2.11,7	Other, Tank	$C = (TP)$		
2.11,10	Other, Other	$C = (TP)$		N
3.0	Operating and Support	Sum of Following		
3.01	Military Personnel	Sum of 3.01i, j	i = 1-4; j = 7 & 10	O
3.011,7	Crew Pay & Allow, TV	$C = (Q_{veh}) * (Q_{crew}) * (AC_{my}) * (Q_{yrs})$		ch =
3.011,10	Crew Pay & Allow, Other	$C = (Q_{veh}) * (Q_{crew}) * (AC_{my}) * (Q_{yrs})$		P
3.012,7	Maint Pay & Allow, TV	$C = (Q_{veh}) * (Q_{maint}) * (AC_{my}) * (Q_{yrs})$		ptp =
3.012,10	Maint Pay & Allow, Other	$C = (Q_{veh}) * (Q_{maint}) * (AC_{my}) * (Q_{yrs})$		prod
3.013,7	Indirect Pay & Allow, TV	$C = (Q_{veh}) * (Q_{ind}) * (AC_{my}) * (Q_{yrs})$		pcs =
3.013,10	Indirect Pay & Allow, Other	$C = (Q_{veh}) * (Q_{ind}) * (AC_{my}) * (Q_{yrs})$		
3.014,7	Perm Change of Station, TV	$C = (Q_{veh}) * (Q_{crew} + Q_{maint} + Q_{ind}) * (AC_{pcs}) * (Q_{yrs})$		pers
3.014,10	Perm Change of Station, Other	C = Same as 2.013,7		Q
3.02	Consumption	Sum of 3.02i, j	i = 1-3; j = 1-10	Q = q
3.021,1	Replenishment Spares	$C = (Q_{eq}) * (ACTY_{yr}) * (C_{ACTY}) * (Q_{yrs})$	i = 1-7 & 9 & 10	
3.022,7	Petro, Oil & Lube, TV	$C = (Q_{veh}) * (ACTY_{yr}) * (C_{ACTY}) * (Q_{yrs})$		R
3.022,10	Petro, Oil & Lube, Other	$C = (Q_{veh}) * (ACTY_{yr}) * (C_{ACTY}) * (Q_{yrs})$		R = r
3.023,6	Unit Tng, Ammo, Missiles	$C = (Q_{veh}) * (AC_{veh/yr}) * (Q_{yrs})$		
3.023,7	Unit Tng, Ammo, Missiles, TV	$C = (Q_{veh}) * (AC_{veh/yr}) * (Q_{yrs})$		S
3.023,10	Unit Tng, Ammo, Missiles, Other	C = same as 3.023,7		svcs
3.03	Depot Maintenance	Sum of 3.03i, j	i = 1-3; j = 1-10	T
3.0311	Labor	$C = (FREQ_{oh}) * (Q_{eq}) * (C_{oh})$	i = 1-5 & 7 & 10	T = t
3.032,7	Materiel, TV	$C = (FREQ_{oh}) * (Q_{eq}) * (C_{oh})$		TP =
3.032,10	Materiel, Other	C = included in 3.031,10		tsets
3.033,1	Transportation, Frame	$C = (FREQ_{oh}) * (Q_{eq}) * (Q_t) * (D_{mf}) * (C_{tm}) * (Q_{yr})$		tpds
3.033,2	Transportation, Propulsion	C = same as 3.033,1		tv =
3.033,7	Transportation, TV	C = same as 3.033,1		tm =
3.033,10	Transportation, Other	C = same as 3.033,1		
3.04,1	Modifications	$C = (\%) * (C_{prod}) * (Q_{yrs})$	i = 1-9	U
3.05	Other Direct Spt Operations	Sum of 3.05i, j	i = 1-2; j = 7 & 10	UC =

Changes, Ammo	$C = (\%) * (C_{prod})$		
Changes, Other	$C = (\%) * (C_{prod})$	H	
Changes, Pec Spt Eq	$C = (\%) * (C_{prod})$		
Changes, Cmn Spt Eq	$C = (\%) * (C_{prod})$	I	
em Test and Evaluation	$C = (Q_{tpds}) * (AC_{tpds})$ $C = (TP)$		ind = indirect personnel indir = indirect
em/Project Mgmt	$C = (Q_{my}) * (AC_{gmy}) + (Q_{my}) * (AC_{cmy})$		
/Site Activation	$C = (TP)$	J	
ning	$C = (Q_{svcs} + sets + spares) * (AC_{my})$		
Sprs & Rpr Parts, Frame	$C = (\%) * (C_{prod})$	K	
" " " , Propulsion	$C = (\%) * (C_{prod})$		
" " " , Commo	$C = (\%) * (C_{prod})$	L	
" " " , Fire Contr	$C = (\%) * (C_{prod})$		
" " " , Armament	$C = (\%) * (C_{prod})$	M	
" " " , Ammo	$C = (\%) * (C_{prod})$		my = manyear
" " " , Other	$C = (\%) * (C_{prod})$		mfg = manufactured
" " " , Spt Eq	$C = (\%) * (C_{prod})$		mi = miles
sportation, Other	$C = (Q_{prod}) * (AC_{dest})$		maint = maintenance men per veh
r, Tank	$C = (TP)$		
r, Other	$C = (TP)$	N	
ating and Support	Sum of Following		
tary Personnel	Sum of 3.011, j	i = 1-4; j = 7 & 10	O
Pay & Allow, TV	$C = (Q_{veh}) * (Q_{crew}) * (AC_{my}) * (Q_{yrs})$		oh = overhead
Pay & Allow, Other	$C = (Q_{veh}) * (Q_{crew}) * (AC_{my}) * (Q_{yrs})$		
t Pay & Allow, TV	$C = (Q_{veh}) * (Q_{maint}) * (AC_{my}) * (Q_{yrs})$		P
t Pay & Allow, Other	$C = (Q_{veh}) * (Q_{maint}) * (AC_{my}) * (Q_{yrs})$		ptp = prototype
rect Pay & Allow, TV	$C = (Q_{veh}) * (Q_{ind}) * (AC_{my}) * (Q_{yrs})$		prod = production
rect Pay & Allow, Other	$C = (Q_{veh}) * (Q_{ind}) * (AC_{my}) * (Q_{yrs})$		pcs = perm change of station cost per yr
Change of Station, TV	$C = (Q_{veh}) * (Q_{crew} + Q_{maint} + Q_{ind}) * (AC_{pcs}) * (Q_{yrs})$		pers = personnel
Change of Station, Other	$C = \text{Same as 2.013,7}$		
umption	Sum of 3.021, j	i = 1-3; j = 1-10	Q
enishment Spares	$C = (Q_{eq}) * (ACTY_{yr}) * (C_{ACTY}) * (Q_{yrs})$	i = 1-7 & 9 & 10	Q = quantity
, Oil & Lube, TV	$C = (Q_{veh}) * (ACTY_{yr}) * (C_{ACTY}) * (Q_{yrs})$		
, Oil & Lube, Other	$C = (Q_{veh}) * (ACTY_{yr}) * (C_{ACTY}) * (Q_{yrs})$		R
Tng, Ammo, Missiles	$C = (Q_{veh}) * (AC_{veh/yr}) * (Q_{yrs})$		R = rate
Tng, Ammo, Missiles, TV	$C = (Q_{veh}) * (AC_{veh/yr}) * (Q_{yrs})$		
Tng, Ammo, Missiles, Other	$C = \text{same as 3.023,7}$		S
Maintenance	Sum of 3.031, j	i = 1-3; j = 1-10	svcs = services
	$C = (FREQ_{oh}) * (Q_{eq}) * (C_{oh})$	i = 1-5 & 7 & 10	T
iel, TV	$C = (FREQ_{oh}) * (Q_{eq}) * (C_{oh})$		T = tons
iel, Other	$C = \text{included in 3.031,10}$		TP = thruput
portation, Frame	$C = (FREQ_{oh}) * (Q_{eq}) * (Q_L) * (D_{mi}) * (C_{tm}) * (Q_{yr})$		tsets = test sets
portation, Propulsion	$C = \text{same as 3.033,1}$		tpds = test periods
portation, TV	$C = \text{same as 3.033,1}$		tv = tracked vehicle
portation, Other	$C = \text{same as 3.033,1}$		tm = ton miles
ications	$C = (\%) * (C_{...}) * (Q_{...})$	i = 1-9	

7

3.011,7	Crew Pay & Allow, TV	$C = (Q_{veh}) * (Q_{crew}) * (AC_{my}) * (Q_{yrs})$	
3.011,10	Crew Pay & Allow, Other	$C = (Q_{veh}) * (Q_{crew}) * (AC_{my}) * (Q_{yrs})$	
3.012,7	Maint Pay & Allow, TV	$C = (Q_{veh}) * (Q_{maint}) * (AC_{my}) * (Q_{yrs})$	P
3.012,10	Maint Pay & Allow, Other	$C = (Q_{veh}) * (Q_{maint}) * (AC_{my}) * (Q_{yrs})$	ptp
3.013,7	Indirect Pay & Allow, TV	$C = (Q_{veh}) * (Q_{ind}) * (AC_{my}) * (Q_{yrs})$	prod
3.013,10	Indirect Pay & Allow, Other	$C = (Q_{veh}) * (Q_{ind}) * (AC_{my}) * (Q_{yrs})$	pcs
3.014,7	Perm Change of Station, TV	$C = (Q_{veh}) * (Q_{crew} + Q_{maint} + Q_{ind}) * (AC_{pcs}) * (Q_{yrs})$	pers
3.014,10	Perm Change of Station, Other	$C = \text{Same as 2.013,7}$	
3.02	Consumption	Sum of 3.021, j	$i = 1-3; j = 1-10$
3.021,1	Replenishment Spares	$C = (Q_{eq}) * (ACTY_{yr}) * (C_{ACTY}) * (Q_{yrs})$	$i = 1-7 \text{ \& } 9 \text{ \& } 10$
3.022,7	Petro, Oil & Lube, TV	$C = (Q_{veh}) * (ACTY_{yr}) * (C_{ACTY}) * (Q_{yrs})$	R
3.022,10	Petro, Oil & Lube, Other	$C = (Q_{veh}) * (ACTY_{yr}) * (C_{ACTY}) * (Q_{yrs})$	R =
3.023,6	Unit Tng, Ammo, Missiles	$C = (Q_{veh}) * (AC_{veh/yr}) * (Q_{yrs})$	S
3.023,7	Unit Tng, Ammo, Missiles, TV	$C = (Q_{veh}) * (AC_{veh/yr}) * (Q_{yrs})$	svcs
3.023,10	Unit Tng, Ammo, Missiles, Other	$C = \text{same as 3.023,7}$	T
3.03	Depot Maintenance	Sum of 3.031, j	$i = 1-3; j = 1-10$
3.031,1	Labor	$C = (FREQ_{oh}) * (Q_{eq}) * (C_{oh})$	$i = 1-5 \text{ \& } 7 \text{ \& } 10$
3.032,7	Materiel, TV	$C = (FREQ_{oh}) * (Q_{eq}) * (C_{oh})$	T =
3.032,10	Materiel, Other	$C = \text{included in 3.031,10}$	TP =
3.033,1	Transportation, Frame	$C = (FREQ_{oh}) * (Q_{eq}) * (Q_t) * (D_{mi}) * (C_{tm}) * (Q_{yr})$	tset
3.033,2	Transportation, Propulsion	$C = \text{same as 3.033,1}$	tpds
3.033,7	Transportation, TV	$C = \text{same as 3.033,1}$	tv =
3.033,10	Transportation, Other	$C = \text{same as 3.033,1}$	tm
3.04,1	Modifications	$C = (\%) * (C_{prod}) * (Q_{yrs})$	$i = 1-9$
3.05	Other Direct Spt Operations	Sum of 3.051, j	$i = 1-2; j = 7 \text{ \& } 10$
3.051,7	Maint, Civ Labor, TV	$C = (Q_{eq}) * (Q_{pers}) * (AC_{my}) * (Q_{yr})$	U
3.051,10	Maint, Civ Labor, Other	$C = \text{Same as 3.051,7}$	UC =
3.052,7	Other Direct, TV	$C = (C_{yr}) * (Q_{yrs})$	UC 1st
3.052,10	Other Direct, Other	$C = \text{same as 3.052,7}$	V
3.06	Indirect Spt Operations	Sum of 3.061, j	$i = 1-5; j = 7 \text{ \& } 10$
3.061,7	Pers Replacement, TV	$C = (Q_{veh}) * (Q_{pers}) * (R_{att}) * (AC_{per man}) * (Q_{yrs})$	veh =
3.061,10	Pers Replacement, Other	$C = \text{same as 3.061,7}$	W
3.062,7	Transients, Patients, Pris, TV	$C = (\%) * (AC_{crew} + AC_{maint} + AC_{indir})$	X
3.062,10	Transients, Patients, Pris, Other	$C = \text{same as 3.062,7}$	Y
3.063,7	Quarters, Maint & Util, TV	$C = (Q_{veh}) * (Q_{pers}) * (AC_{man}) * (Q_{yrs})$	yr =
3.063,10	Quarters, Maint & Util, Other	$C = \text{same as 3.063,7}$	yrs =
3.064,7	Medical Support, TV	$C = (Q_{veh}) * (Q_{pers}) * (AC_{man}) * (Q_{yrs})$	
3.064,10	Medical Support, Other	$C = \text{same as 3.064,7}$	
3.065,7	Other Indirect, TV	$C = (C_{yr}) * (Q_{yrs})$	Z
3.065,10	Other Indirect, Other	$C = \text{same as 3.065,7}$	

$C = (Q_{veh}) * (Q_{crew}) * (AC_{my}) * (Q_{yrs})$
 $C = (Q_{veh}) * (Q_{crew}) * (AC_{my}) * (Q_{yrs})$
 $C = (Q_{veh}) * (Q_{maint}) * (AC_{my}) * (Q_{yrs})$
 $C = (Q_{veh}) * (Q_{maint}) * (AC_{my}) * (Q_{yrs})$
 $C = (Q_{veh}) * (Q_{ind}) * (AC_{my}) * (Q_{yrs})$
 $C = (Q_{veh}) * (Q_{ind}) * (AC_{my}) * (Q_{yrs})$
 $C = (Q_{veh}) * (Q_{crew} + Q_{maint} + Q_{ind}) * (AC_{pcs}) * (Q_{yrs})$
 $C = \text{Same as 2.013,7}$
 Sum of 3.024, j
 $C = (Q_{eq}) * (ACTY_{yr}) * (C_{ACTY}) * (Q_{yrs})$
 $C = (Q_{veh}) * (ACTY_{yr}) * (C_{ACTY}) * (Q_{yrs})$
 $C = (Q_{veh}) * (ACTY_{yr}) * (C_{ACTY}) * (Q_{yrs})$
 $C = (Q_{veh}) * (AC_{veh/yr}) * (Q_{yrs})$
 $C = (Q_{veh}) * (AC_{veh/yr}) * (Q_{yrs})$
 $C = \text{same as 3.023,7}$
 Sum of 3.034, j
 $C = (FREQ_{oh}) * (Q_{eq}) * (C_{oh})$
 $C = (FREQ_{oh}) * (Q_{eq}) * (C_{oh})$
 $C = \text{included in 3.031,10}$
 $C = (FREQ_{oh}) * (Q_{eq}) * (Q_t) * (D_{mi}) * (C_{tm}) * (Q_{yr})$
 $C = \text{same as 3.033,1}$
 $C = \text{same as 3.033,1}$
 $C = \text{same as 3.033,1}$
 $C = (\%) * (C_{prod}) * (Q_{yrs})$
 Sum of 3.054, j
 $C = (Q_{eq}) * (Q_{pers}) * (AC_{my}) * (Q_{yr})$
 $C = \text{Same as 3.051,7}$
 $C = (C_{yr}) * (Q_{yrs})$
 $C = \text{same as 3.052,7}$
 Sum of 3.061, j
 $C = (Q_{veh}) * (Q_{pers}) * (R_{att}) * (AC_{per man}) * (Q_{yrs})$
 $C = \text{same as 3.061,7}$
 $C = (\%) * (AC_{crew} + AC_{maint} + AC_{indir})$
 $C = \text{same as 3.062,7}$
 $C = (Q_{veh}) * (Q_{pers}) * (AC_{man}) * (Q_{yrs})$
 $C = \text{same as 3.063,7}$
 $C = (Q_{veh}) * (Q_{pers}) * (AC_{man}) * (Q_{yrs})$
 $C = \text{same as 3.064,7}$
 $C = (C_{yr}) * (Q_{yrs})$
 $C = \text{same as 3.065,7}$

P
 ptp = prototype
 prod = production
 pcs = perm change of station cost per yr
 pers = personnel

 Q
 Q = quantity

 R
 R = rate

 S
 svcs = services

 T
 T = tons
 TP = thruput
 tsets = test sets
 tpds = test periods
 tv = tracked vehicle
 tm = ton miles

 U
 UC = unit cost
 UC_{1st} = first unit cost

 V
 veh = vehicles

 W

 X

 Y
 yr = year
 yrs = years

 Z

g. System Test and Evaluation (1.06,7). This cell contains the cost of system related development and operational test activities (DT/OT I & II).

h. System/Project Management (1.07,7). This cell contains the cost of the government management office throughout the R&D phase.

i. Training (1.08,7). This cell contains the cost of all training, including services and equipment, to operate and maintain the tracked vehicle system with maximum efficiency.

j. Facilities (1.09,7). This cell contains the cost of any new building, conversion or expansion of facilities or sites, and the acquisition of real estate for development and testing of the tracked vehicle system.

k. Other, Tracked Vehicle System Related (1.10,7). This cell contains other R&D costs not included in the above related to the tracked vehicle system.

l. Other, Other (1.10,10). This cell contains other R&D costs not included elsewhere and not related to the tracked vehicle system. It also includes costs already incurred and funds obligated (sunk costs).

4. Investment Phase.

a. General. Guidance for estimating Investment costs is contained in DA Pamphlet 11-3, Investment Cost Guide for Army Materiel Systems. Production, engineering changes, initial spares, and repair parts are estimated by system structure. All other cost elements are estimated at some level of aggregation. Thirty-six cells of the tracked vehicle model are active in this phase.

b. Non-Recurring Investment (2.01,7). This cell is costed as a thruput. It includes pre-production planning, tooling, facilities, and industrial plant equipment. Cost data are not available for costing at a more detailed level.

c. Production, Frame (2.02,1). This cell contains the production cost of the tracked vehicle hull, turret, suspension system, partial power train components, integration, and assembly. Engineering changes (2.03,1), quality control, and sustaining tooling are included in manufacturing cost. Recurring engineering cost is estimated as a percentage of manufacturing cost.

d. Production, Propulsion (2.02,2). This cell contains the production cost of the tracked vehicle engine and transmission. Quality control, sustaining tooling and recurring engineering are included in manufacturing cost.

e. Production, Communications (2.02,3). This cell contains the production cost of the tracked vehicle communications equipment. Quality control, sustaining tooling, and recurring engineering are included in manufacturing cost.

f. Production, Fire Control (2.02,4). This cell contains the production cost of the tracked vehicle fire control system. Quality control, sustaining tooling, and recurring engineering are included in manufacturing cost.

g. Production, Armament (2.02,5). This cell contains the production cost of the tracked vehicle armament system. Recurring engineering, and sustaining tooling are included in manufacturing cost. Quality control and proof acceptance testing are estimated as a percentage of manufacturing cost. Cost of gun mounts, muzzle brake and other gun ancillary equipment is added as a thruput.

h. Production, Ammunition (2.02,6). This cell contains the production cost of the ammunition for the tracked vehicle armament section. Sustaining tooling is included in manufacturing cost. Quality control and recurring engineering are estimated as a percentage of manufacturing cost.

i. Production, Other (2.02,7). This element includes the cost of other equipment not identified above that completes the tracked vehicle system (e.g., Drivers Night Vision Devices, Gun Mounts, etc.).

j. Production, Peculiar Support Equipment (2.02,8). This element includes the cost of equipment required to maintain and care for the system while not directly engaged in the performance of its mission (e.g., loader-transporter, test sets, etc.).

k. Production, Common Support Equipment (2.02,9). This element includes the cost of equipment required to maintain and care for the system while not directly engaged in the performance of its mission, and which is presently in the DoD inventory for support of other systems (e.g., tool sets, wrecker, etc.).

l. Engineering changes (2.03). This cost element contains costs associated with official alterations made to a system while it is still in the manufacturing process. Frame engineering changes are included in (2.02,1).

m. System Test and Evaluation (2.04,7). This cost element contains the cost of system related development and operational test activities (DT/OT III).

n. Data (2.05,7). This cost element is costed as a thruput. It includes the cost of gathering, storing, reproducing, and disseminating data throughout the production cycle.

o. System/Project Management (2.06,7). This cost element includes the cost of the government project management office throughout the investment phase.

p. Operational/Site Activation (2.07,10). This cost cell should be developed based upon the requirements of the specific system involved.

q. Training (2.08,7). This cost cell is costed as a thruput. It includes all initial training to operate and maintain the tracked vehicle system with maximum efficiency.

r. Initial Spares and Repair Parts (2.09). This cell element is estimated as a percentage of production cost by system structure. It includes initial provisioning of spare components, sub-assemblies, and repair parts of the system structure.

s. Transportation, Tracked Vehicle (2.10,7). This cost cell contains first and second destination transportation cost of the tracked vehicle system and its initial spares and repair parts.

t. Other, Tracked Vehicle (2.11,7). This cell contains other investment costs, not included elsewhere, related to the tracked vehicle system.

u. Other, Other (2.11,10). This cell contains other investment costs not included elsewhere and not related to the tracked vehicle system.

5. Operating and Support O&S Phase.

a. General. Guidance for estimating O&S costs is contained in DA Pamphlet 11-4, Operating and Support Cost Guide for Army Materiel Systems. For tracked vehicle system costing purposes, the battalion has been selected as the basic tactical force unit. Battalion costs (excluding the tracked vehicle system costs) are displayed in the system structure column, Other (10). Fifty-seven cells of the tracked vehicle model are active in this phase. Table of Organization and Equipment (TOE) or a Manning Table and Equipment List (MTEL) should serve as a basis for this phase.

b. Military Personnel (3.01). This cost element is the sum of Crew Pay and Allowances (3.011), Maintenance Pay and Allowance (3.012), Indirect Pay and Allowances (3.013), and Permanent Change of Station (3.014).

(1) Crew Pay and Allowance (3.011). This cost element includes the basic pay and allowances (quarters and subsistence), theatre pay, and special pay (if applicable) for the tracked vehicle system and battalion related crewmen.

(2) Maintenance Pay and Allowance (3.012). This cost element includes the basic pay and allowances (quarters and subsistence), theatre pay, and special pay (if applicable) for the tracked vehicle system and battalion related maintenance personnel.

(3) Indirect Pay and Allowance (3.013). The cost element includes the basic pay and allowances (quarters and subsistence), theatre pay, and special pay (if applicable) for the tracked vehicle and battalion related indirect personnel.

(4) Permanent Change of Station (3.014). This cost element includes the cost of travel for crewmen, maintenance and indirect personnel for the tracked vehicle system and the battalion.

c. Consumption (3.02). This cost element is the sum of Replenishment Spares (3.021), Petroleum, Oil and Lubricants (3.022), and Unit Training, Ammunition and Missiles (3.023).

(1) Replenishment Spares (3.021). This cost element includes the annual procurement costs of repair parts and secondary items for the tracked vehicle system and the battalion.

(2) Petroleum, Oil and Lubricants (POL) (3.022). This cost element includes POL consumption for the tracked vehicle system and the battalion.

(3) Unit Training, Ammunition and Missiles (3.023). This cost element includes the cost of ammunition consumed by the tracked vehicle system and battalion personnel during annual training. If any, missile consumption cost should be added as a thruput.

d. Depot Maintenance (3.03). Depot maintenance includes labor, materiel, and transportation to and from the depot.

(1) Labor (3.031). This cost element includes the labor cost for the repair and overhaul of the tracked vehicle system and battalion related equipment at the depot level.

(2) Materiel (3.032). This cost element includes the materiel cost for the repair and overhaul of the tracked vehicle system and battalion related equipment at the depot level.

(3) Transportation (3.033). This cost element includes the transportation cost for the repair and overhaul of the tracked vehicle system and battalion related equipment at the depot level.

e. Modifications (3.04). This cost element includes modification work orders, retrofits, conversion, re-manufacture or engineering changes after acceptance by the Army. It is estimated as a function of production costs.

f. Other Direct Support Operations (3.05). This cost element includes maintenance (civilian labor) and other direct costs.

(1) Maintenance, Civilian Labor (3.051). This element includes the cost (if any) of civilian maintenance labor below depot. Depot civilian labor is included in (3.03).

(2) Other Direct (3.052). This cost element includes the cost of OMA funded unit operations, prescribed load list (PLL) repair parts - battalion related, minor equipment, and organization clothing and equipment for the tracked vehicle system and the battalion. All POL costs are excluded in this cost element.

g. Indirect Support Operation (3.06). This cost element includes the cost of personnel replacement, transients, patients and prisoners, quarters, maintenance and utilities, medical support, and other indirect support operations.

(1) Personnel Replacement (3.061). This cost element includes the cost to replace those personnel in Military Personnel (3.01) for the tracked vehicle system and the battalion.

(2) Transients, Patients and Prisoners (TPP) (3.062). This cost element is estimated as a percentage of military personnel cost for the tracked vehicle system and the battalion.

(3) Quarters, Maintenance and Utilities (3.063). This cost element is estimated based upon per capita factors. It includes the cost of maintenance and utilities for personnel living in government owned quarters for the tracked vehicle system and the battalion.

(4) Medical Support (3.064). This cost element includes the OMA funded cost of medical and dental support rendered to military personnel of the tracked vehicle system and the battalion.

(5) Other Indirect (3.065). This cost element includes OMA funded costs of base operations, central supply, personnel and administrative activities, and project management and product improvement offices for the tracked vehicle system and the battalion.

CHAPTER 3

COMPUTER IMPLEMENTATION OF THE TRACKED VEHICLE COST MODEL

1. General. Chapter 2 described the generic tracked vehicle cost model. It provided the means to calculate a total life cycle cost estimate in constant FY 72 dollars. For the purposes of speed, accuracy and further detail, an automated model has been developed. This chapter describes the computer implementation of the generic tracked vehicle cost model.

2. Relationship to Army Life Cycle Cost Model.

a. The Army Life Cycle Cost Model (ALCCM) is a computer program which produces both static and timephased cost estimates for major Army weapon systems (Army Life Cycle Cost Model User's Guide, Vol 1, DCA-R-15, January 1976). This model is patterned after the Research and Development, Investment, and Operating and Support Cost Guides.

b. The Tracked Vehicle Life Cycle Cost Model (TVLCCM) is an extension of the ALCCM. The input/output computer formats and the computer equations are made to accommodate the tracked vehicle systems costing methodology described in Chapter 2. The modifications made to the ALCCM are described in Figure 2.

3. Tracked Vehicle Life Cycle Cost Model.

a. The cost equations described in Chapter 2 produce a constant year dollar cost display in accordance with the Army Life Cycle Cost Matrix. This display is equivalent to report 1 of the output of the TVLCCM (constant dollar cost-by-cost element and system structure).

b. The TVLCCM is capable of producing several additional reports. These reports, along with supporting input files, are described in Table 2. A detailed description for setting up input files and running the model can be found in the ALCCM User's Guide.

MODIFICATIONS TO THE ARMY LIFE CYCLE COST MODEL (ALCCM)

FOR TRACKED VEHICLE USAGE

1. Five new Unit Cost and five new Experience Curve variables have been added to the data input file (lines 721 and 746 respectively).

700	UC					
705	0	0	0	0	0	0
710	0	0	0	0	0	0
715	0	0	0	0	0	0
720	0	0	0	0	0	0
721	0	0	0	0	0	0
725	EC					
730	0	0	0	0	0	0
735	0	0	0	0	0	0
740	0	0	0	0	0	0
745	0	0	0	0	0	0
746	0	0	0	0	0	0

2. The major program was changed to account for the additional 10 variables (line 750) and five equations were changed (lines 2160 thru 2310).

750	DATA	NROW/3,45,1,57,16,5,5,4,9,99/
2160	A(14,1)=UC(11)*XN(101)**(1.0+B(11))*	
2170&	(1.0+CF(11))*SF(P)	
2180C	THIS LINE ELIMINATED	
2190	A(14,2)=(UC(12)*XN(102)**(1.0+B(12))+UC(21)*	
2200&	XN(82)**(1.0+B(21)))*(1.+CF(12))*SF(P)	
2210C	THIS LINE ELIMINATED	
2220C	THIS LINE REMAINS THE SAME	
2230C	THIS LINE REMAINS THE SAME	
2240C	THIS LINE REMAINS THE SAME	
2250	A(14,4)=UC(14)*XN(104)**(1.0+B(14))*(1.+CF(14))*SF(P)	
2260C	THIS LINE ELIMINATED	
2270C	THIS LINE ELIMINATED	
2280	A(14,5)=UC(15)*((XN(105)+PB(15))** (1.+B(15))-PB(15)**	
2290&	(1.+B(15)))*(1.+CF(15))*SF(P)	
2300C	THIS LINE ELIMINATED	
2310	A(14,6)=UC(16)*XN(106)**(1.0+B(16))*SF(5)*(1.+CF(16))	
2320C	THIS LINE ELIMINATED	
2330C	THIS LINE ELIMINATED	

TABLE 2

TRACKED VEHICLE LIFE CYCLE COST MODEL REPORTS

REPORT	REPORT NAME	TYPE	\$	X	Data Input File	Definition File	Appropriations File	Time Phasing File	Composite Index File	Header File
1	Cost Element by System Structure	Constant		X						
2	Key Cost Definitions	Constant		X	X					X
3	Appropriations by Life Cycle Phase	Constant		X		X				X
4	Appropriations by Year (RD, Inv, O&S)	Constant		X		X	X	X	X	X
5	Appropriations by Year (Total)	Constant		X		X	X	X	X	X
6	Appropriations by Year (RD, Inv, O&S)	Current		X		X	X	X	X	X
7	Appropriations by Year (Total)	Current		X		X	X	X	X	X
8	Appropriations by Life Cycle Phase	Current		X		X	X	X	X	X

APPENDIX 1

APPENDIX 1

TRACKED VEHICLE LIFE CYCLE COST MODEL DOCUMENTATION

A-1. General. This appendix describes the documentation for the Tracked Vehicle System Life Cycle Cost Model.

A-2. Documentation Requirements. The documentation of the Tracked Vehicle Life Cycle Cost Model includes the following points:

- a. A recording of the cost data expression (equation) which yields the value in the cell.
- b. A listing of the inclusions and exclusions of the expression; that is, the bounds within which the expression applies.
- c. A recording of the expression in mathematical notation.
- d. A listing of the values assigned to input variables.
- e. A discussion of how individual values were derived.
- f. A recording of the source(s) leading to the choice of values.

A-3. Documentation Formats.

a. The documentation requirements suggest that the seven points are best covered in two formats: A "Cost Data Sheet" and a "Variable Explanation Sheet." The Cost Data Sheet covers the first four points. The last three points are covered in the Variable Explanation Sheet. Documentation is split between these two formats purposely, to avoid unnecessary duplication since certain variables are necessarily repeated in selected cost expressions.

b. The cost estimate is considered documented when a Cost Data Sheet has been prepared for each cost expression and a Variable Explanation Sheet has been prepared for each input variable for that expression. The cost analyst should append to the Variable Explanation Sheet any evidence to support the choice of values; e.g., cost quantity curves or data and statistical material related to regression derivation.

A-4. Cost Data Sheets and Variable Explanation Sheets. The remainder of this appendix includes the full documentation of the general cost model. The variable names used for the documentation are the expression used in the automated version of the cost model. Cost Data Sheets for all currently active cells in the TVLCCM follow this section. Variable Explanation Sheets are not included in this document in that they present data which is peculiar to either MICV or XM-1 systems and are not generally pertinent to other tracked vehicle systems. The Variable Explanation Sheets are available at the Office of the Directorate of Cost Analysis, Comptroller of the Army, HQDA, for review by interested parties.

CELL NO: A (1.01, 7)

DATE: _____

COST DATA SHEET

ITEM: DEVELOPMENT ENGINEERING

COST DATA EXPRESSION:

Cost = (Number of Contractor man years) x (cost per contractor man year)
+ (thruput for gov't in-house cost) x (shift factor)

INCLUDES:

Development Engineering,
Contractor and in-house.

EXCLUDES:

Sunk cost (See A(1.10, 10))

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(1.01, 7) = (XN(7) * AC(7) + (\text{thruput}) * SF(1))$

VARIABLES ARE:

$XN(7)$ = Man years of engineering effort, contract

$AC(7)$ = Average cost per contractor man year

Thruput = Gov't In-house effort (M FY xx \$)

$SF(1)$ = Constant dollar shift factor, RDT&E

CELL NO: A (1.02,7)
DATE: _____

COST DATA SHEET

ITEM: R&D, PRODUCIBILITY, ENGINEERING AND PLANNING (PEP)

COST DATA EXPRESSION:

Cost = Thruput

INCLUDES:

Producibility studies
Preparation of the tech data package
Special Purpose Prod Equip

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(1.02,7) = \text{Thruput} * SF(1)$

VARIABLES ARE:

Thruput (M FY ~~xx~~ \$)

SF(1) = Constant Dollar Shift Factor, RDT&E

CELL NO: A (1.03,7)
DATE: _____

COST DATA SHEET

ITEM: TOOLING

COST DATA EXPRESSION:

Cost = Thruput

INCLUDES:

Common Tooling
Peculiar Tooling
TMD Equipment

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(1.03,7) = \text{Thruput} * SF(1)$

VARIABLES ARE:

Thruput (M FY xx \$)

SF(1) = Constant Dollar Shift Factor, RDT&E

CELL NO: A (1.04,7)

DATE: _____

COST DATA SHEET

ITEM: PROTOTYPE MANUFACTURING

COST DATA EXPRESSION:

Cost = Thruput

INCLUDES: Completion of 11 all-up vehicles
Ballistic hull/turret (1)
Contractor Facility Vehicle (2)

EXCLUDES: Spares and repair parts

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(1.04,7) = \text{Thruput} * SF(1)$

VARIABLES ARE:

Thruput (M FY xx \$)

SF(1) = Constant Dollar Shift Factor, RDT&E

CELL NO: A (1.05,7)
DATE: _____

COST DATA SHEET

ITEM: DATA

COST DATA EXPRESSION:

Cost = Thruput

INCLUDES: Manuals & Pubs
Engineering Data
Management Data

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(1.05,7) = \text{Thruput} * SF(1)$

VARIABLES ARE:

Thruput (M FY xx \$)

SF(1) = Constant Dollar Shift Factor, RDT&E

CELL NO: A (1.06,7)

DATE: _____

COST DATA SHEET

ITEM: SYSTEM TEST AND EVALUATION

COST DATA EXPRESSION:

Cost = Thruput (M FY 72 \$)

INCLUDES: DT/OT II
 Contractor
 In-House

EXCLUDES: DT/OT III (See Investment Phase)

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(1.06,7) = \text{Thruput} * SF(1)$

VARIABLES ARE:

Thruput (M FY ~~xx~~ \$)

SF(1) = Constant Dollar Shift Factor, RDT&E

CELL NO: A (1.07.7)
DATE: _____

COST DATA SHEET

ITEM: SYSTEM/PROJECT MANAGEMENT

COST DATA EXPRESSION:

Cost = Thruput

INCLUDES: Contractor/In-House Project Management

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(1.07,7) = \text{Thruput} * SF(1)$

VARIABLES ARE:

Thruput (M FY xx \$)

SF(1) = Constant Dollar Shift Factor, RDT&E

CELL NO: A (1.08,)
DATE: _____

COST DATA SHEET

ITEM: TRAINING

COST DATA EXPRESSION:

Cost = Thruput

INCLUDES: Contractor
In-House

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(1.08, 7) = \text{Thruput} * SF(1)$

VARIABLES ARE:

Thruput (M FY xx \$)

SF(1) = Constant Dollar Shift Factor, RDT&E

CELL NO: A (1.09, 7)
DATE: _____

COST DATA SHEET

ITEM: FACILITIES

COST DATA EXPRESSION:

Cost = Thruput

INCLUDES:

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(1.09, 7) = \text{Thruput} * SF(1)$

VARIABLES ARE:

Thruput (M FY xx \$)

SF (1) = Constant Dollar Shift Factor, RDT&E

CELL NO: A (1.10, 7)
DATE: _____

COST DATA SHEET

ITEM: OTHER, TRACKED VEHICLE SYSTEM RELATED

COST DATA EXPRESSION:

Cost = Thruput

INCLUDES: SSEB

Spares and repair parts
SEM Contractor

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(1.10, 7) = \text{Thruput} * SF(1)$

VARIABLES ARE:

Thruput (M FY xx \$)

SF(1) = Constant Dollar Shift Factor, RDT&E

COST DATA SHEET

ITEM: OTHER, OTHER

COST DATA EXPRESSION:

Cost = Thruput

INCLUDES: Actual costs incurred and funds obligated through FY 76 for:
Validation phase,
DARCOM, PMO in-house costs,
long lead item contracts,
TECOM funding.

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$$A(1.10,10) = \text{Thruput} * SF(1)$$

VARIABLES ARE:

Thruput (M FY xx \$)

SF(1) = Constant Dollar Shift Factor, RDT&E.

CELL NO: A (2.01,7)

DATE: _____

COST DATA SHEET

ITEM: NON-RECURRING INVESTMENT, TRACKED VEHICLE SYSTEM

COST DATA EXPRESSION:

Cost = Thruput

INCLUDES: Pre-production planning, tooling, facilities, and industrial plant equipment and site preparation.

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(2.01,7) = \text{Thruput} * SF(4)$

VARIABLES ARE:

SF(4) = Constant dollar shift factor, WPN

Thruput = (FY xx \$)

CELL NO: A (2.02,1)

DATE: _____

COST DATA SHEET

ITEM: PRODUCTION, FRAME

COST DATA EXPRESSION: $\text{Cost} = (\text{Engineering} + \text{Manufacturing}) \times (\text{Shift Factor})$

where: Engineering = % of Manufacturing Cost

$\text{Mfg} = (\text{First Unit Cost}) \times (\text{Quantity})^{-B} \times (\text{Quantity})$

and B = Improvement Curve Slope, Log-Linear Average Curve

INCLUDES: Hull, Turret, Suspension, Power Train (Partial), Recurring Tooling, Contractor Quality Control, Engineering Changes, Integration and Assembly.

EXCLUDES: Engine, Transmission, Fire Control, Gun and Mount, OEM, Communications Equip, BILI, Gvm't In-House Engineering and Quality Control

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(2.02,1) = (UC(11) * XN(101) ** B(11) * XN(101)) * (1.0 + CF(11)) * SF(4)$

VARIABLES ARE:

UC(11) = First Unit Cost, Frame

XN(101) = Quantity, Frame

B(11) = Improvement Curve Slope

CF(11) = Cost Factor, Engineering

SF(4) = Constant Dollar Shift Factor, Proc WPN

CELL NO: A (2.02,2)

DATE: _____

COST DATA SHEET

ITEM: PRODUCTION, PROPULSION

COST DATA EXPRESSION:

Production = (Manufacturing Cost incl Sustaining Tooling, Recurring Engineering, and Quality Control) x (Shift Factor)

INCLUDES: Production of Engine and Transmission

EXCLUDES: Other power train components such as final drives, linkages, etc. Have been costed as part of the vehicle. See Cell A(2.02,1).

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(2.02,2) = (UC(12)*XN(102)**B(12)*XN(102) + UC(21)*XN(82)**B(21)*XN(82))*SF(4)$

VARIABLES ARE:

UC(12) = First Unit Cost, Engine

XN(102) = Quantity, Engine

B(12) = Improvement Curve Slope, Engine

UC(21) = First Unit Cost, Transmission

XN(82) = Quantity, Transmission

B(21) = Improvement Curve Slope, Transmission = -.02184

SF(4) = Constant Dollar Shift Factor, Proc, WPN

CELL NO: A (2.02,3)
DATE: _____

COST DATA SHEET

ITEM: PRODUCTION, COMMUNICATIONS

COST DATA EXPRESSION:

Cost = (Quantity of Vehicles) x (Avg Cost Per Radio Set) x (Shift Factor)

INCLUDES:

Basic Radio, Aux Receiver, Antenna, COMSEC and ECCM equipment.

EXCLUDES:

DATA SOURCE:

SINGARS-V, Cost Analysis Brief, 10 Nov 75

FINAL COST MODEL EXPRESSION:

$A(2.02,3) = XN(83) * AC(73) * SF(4)$

VARIABLES ARE:

$XN(83)$ = Quantity, Comm Equip

$AC(73)$ = Average Cost, Comm Equip

$SF(4)$ = Constant Dollar Shift Factor, Proc, WPN

CELL NO: A (2.02,4)

DATE: _____

COST DATA SHEET

ITEM: PRODUCTION, FIRE CONTROL

COST DATA EXPRESSION:

Cost = (Engineering + Quality Control + Manufacturing + Tooling) x (Shift Factor)

INCLUDES: The gunners and commanders periscopes and telescopes, ballistic computer, night vision capability, cost sensors, quadrant, instruments and indicators, hydraulic drive system, laser range finder, and stabilization system.

EXCLUDES: Integration.

DATA SOURCE:

Frankford Arsenal, Fire Control Section

FINAL COST MODEL EXPRESSION:

$A(2.02,4) = UC(14) * XN(104) ** B(14) * XN(104) * SF(4)$

VARIABLES ARE:

UC(14) = Average Unit Cost, Fire Control

XN(104) = Quantity, Fire Control

B(14) = Improvement Curve Slope

SF(4) = Constant Dollar Shift Factor, Proc. WPN

CELL NO: A (2.02,5)

DATE: _____

COST DATA SHEET

ITEM: PRODUCTION , ARMAMENT

COST DATA EXPRESSION:

Cost = (Engineering + Quality Control + Manufacturing + Tooling) x (Shift Factor)

INCLUDES: Gun Tube, Breech. Bore Evacuator. and gun.

EXCLUDES: Gun Mount, Muzzle Brake
Prior buys of M68 Cannon, 105mm Gun

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$$A(2.02,5) = \frac{UC(15) * ((XN(105) + PB(15))^{**}(1. + B(15)) - PB(15)^{**}(1. + B(15)))}{(1. + CF(15)) * SF(4)}$$

VARIABLES ARE:

UC(15) = First Unit Cost
PB(15) = Quantity, Prior Buy
XN(105) = Quantity, Armament
B(15) = Improvement Curve Slope
CF(15) = Cost Factor, QC and Proof Acceptance
SF(4) = Constant Dollar Shift Factor

CELL NO: A (2.02,6)

DATE: _____

COST DATA SHEET

ITEM: PRODUCTION , MAIN GUN AMMUNITION

COST DATA EXPRESSION:

Cost = (Engineering + Quality Control + Manufacturing + Tooling) x
Shift Factor

where

Mfg = (First Unit Cost) x (Quantity)^{-B} x Quantity

and B = Improvement Curve Slope, Log-Linear Average Curve

INCLUDES:

Main gun ammo, new development rounds
Manufacturing, Tooling, Quality Control, Engineering Support to
Production

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(2.02,6) = UC(16) * XN(106) ** B(16) * XN(106) * (1. + CF(16)) * SF(5)$

VARIABLES ARE:

UC(16) = First Unit Cost

XN(106) = Quantity, Ammunition

B(16) = Improvement Curve Slope

SF(5) = Constant Dollar Shift Factor, Proc, Ammo

CF(16) = QC and Engr Cost Factor

CELL NO: A (2.02,7)
DATE: _____

COST DATA SHEET

ITEM: Production, Other

COST DATA EXPRESSION:

Cost = Thruput

INCLUDES:

Drivers Night Vision Device, Commander's, Loader's or Other Weapon,
OEM, CBR, Main Gun Mount.

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(2.02,7) = \text{Thruput} * SF(4)$

VARIABLES ARE:

Thruput = (FY xx \$)

SF(4) = Constant dollar shift factor, Proc Wpn

CELL NO: A (2.02,8)
DATE: _____

COST DATA SHEET

ITEM: Production - Peculiar Support Equipment

COST DATA EXPRESSION:

Production Cost = Recurring Engineering & Sustaining Tooling
& Manufacturing & Quality Control

INCLUDES:

To be specified for tracked vehicle system under consideration

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$$A(2.02,8) = (XN(88)*AC(78) + XN(98)*AC(88) + (1. + CF(18)) \\ * (UC(18)*(PB(18) + XN(108))*((1. + B(18)) - \\ PB(18) \times (1. + B(18))))*SF(P)$$

VARIABLES ARE:

XN(88) = Number of Engineering Manyears
AC(78) = Average Cost per Manyear
XN(98) = Number of Quality Control Manyears
AC(88) = Average Cost per Manyear
CF(18) = Cost Factor for Tooling
UC(18) = First Unit Cost
PB(18) = Previous Buy Quantity
XN(108) = Quantity Manufactured
B(18) = Slope of Experience Curve
SF(P) = Constant Dollar Shift Factor for Procurement

CELL NO: A (2.02,9)
DATE. _____

COST DATA SHEET

ITEM: Production-Common Support Equipment

COST DATA EXPRESSION:

Production Cost = Recurring Engineering & Sustaining Tooling
& Manufacturing & Quality Control

INCLUDES:

To be specified for tracked vehicle system

EXCLUDES:

FINAL COST MODEL EXPRESSION:

$$A(2.02,9) = (XN(89)*AC(79) + XN(99)*AC(89) + (1. + CF(19))) \\ * (UC(19)*(PB(19) + XN(109))** (1. + B(L()) - PB(19) X \\ (1. + B(19)))) * SF(P)$$

VARIABLES ARE:

XN(89) = Number of Engineering Manyears
AC(79) = Average Cost per Manyear
XN(99) = Number of Quality Control Manyears
AC(89) = Average Cost per Manyear
CF(19) = Cost Factor for Tooling
UC(19) = First Unit Cost
PB(19) = Previous Buy Quantity
XN(109) = Quantity Manufactured
B(19) = Slope of Experience Curve
SF(P) = Constant Dollar Shift Factor for Procurement

CELL NO: A (2.03,1)
DATE: _____

COST DATA SHEET

ITEM: ENGINEERING CHANGE, FRAME

COST DATA EXPRESSION:

Cost = (Cost Factor) x (Production, Frame)

INCLUDES: Costs associated with official alterations made to a system while it is still in the manufacturing process.

EXCLUDES: Modification work orders

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(2.03,1) = CF(21) * A(2.03,1)$

VARIABLES ARE:

CF(21) = Cost Factor, Engineering Changes
A(2.03,1) = Frame Production Cost

CELL NO: A (2.03,2)
DATE: _____

COST DATA SHEET

ITEM: ENGINEERING CHANGES, PROPULSION

COST DATA EXPRESSION:

Cost = (Cost Factor) x (Production, Propulsion)

INCLUDES: Costs associated with official alterations made to a system while it is still in the manufacturing process.

EXCLUDES: Modification work orders

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(2.03,2) = CF(22) * A(2.03,2)$

VARIABLES ARE:

CF(22) = Cost Factor, Engineering Changes
A(2.03,2) = Propulsion Production Cost

CELL NO: A (2.03,3)
DATE: _____

COST DATA SHEET

ITEM: ENGINEERING CHANGES, COMMUNICATIONS EQUIPMENT

COST DATA EXPRESSION:

Cost = (Cost Factor) x (Production, Communications)

INCLUDES: Costs associated with official alterations made to a system while it is still in the manufacturing process.

EXCLUDES: Modification work orders

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(2.03,3) = CF(23) * A(2.03,3)$

VARIABLES ARE:

CF(23) = Cost Factor, Engineering Changes
A(2.03,3) = Communications Production Cost

CELL NO: A (2.03,4)
DATE: _____

COST DATA SHEET

ITEM: ENGINEERING CHANGES, FIRE CONTROL

COST DATA EXPRESSION:

Cost = (Cost Factor) x (Production, Fire Control)

INCLUDES: Costs associated with official alterations made to a system while it is still in the manufacturing process.

EXCLUDES: Modification work orders

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(2.03,4) = CF(24) * A(2.03,4)$

VARIABLES ARE:

CF(24) = Cost Factor, Engineering Changes
A(2.03,4) = Fire Control Production Cost

CELL NO: A (2.03,5)
DATE: _____

COST DATA SHEET

ITEM: ENGINEERING CHANGES, ARMAMENT

COST DATA EXPRESSION:

Cost = (Cost Factor) x (Production, Armament)

INCLUDES: Costs associated with official alterations made to a system while it is still in the manufacturing process.

EXCLUDES: Modification work orders

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(2.03,5) = CF(25) * A(2.03,5)$

VARIABLES ARE:

CF(25) = Cost Factor, Engineering Changes
A(2.03,5) = Armament Production Cost

CELL NO: A (2.03,6)
DATE: _____

COST DATA SHEET

ITEM: ENGINEERING CHANGES, AMMUNITION

COST DATA EXPRESSION:

Cost = (Cost Factor) x (Production, Ammunition)

INCLUDES: Costs associated with official alterations made to a system while it is still in the manufacturing process.

EXCLUDES: Modification work orders

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(2.03,6) = CF(26) * A(2.03,6)$

VARIABLES ARE:

CF(26) = Cost Factor, Engineering Changes
A(2.03,6) = Ammunition Production Cost

CELL NO: A (2.03.7)
DATE: _____

COST DATA SHEET

ITEM: ENGINEERING CHANGES, OTHER

COST DATA EXPRESSION:

Cost = (Cost Factor) x (Production, Other)

INCLUDES: Costs associated with official alterations made to a system while it is still in the manufacturing process.

EXCLUDES: Modification work orders

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(2.03,7) = CF(27) * A(2.03,7)$

VARIABLES ARE:

CF(27) = Cost Factor, Engineering Changes
A(2.03,7) = Other Production Cost

CELL NO: A (2.03.8)
DATE: _____

COST DATA SHEET

ITEM: ENGINEERING CHANGES, PECULIAR SUPPORT

COST DATA EXPRESSION:

Cost = (Cost Factor) x (Production, Peduliar Support)

INCLUDES: Costs associated with official alterations made to a system while it is still in the manufacturing process.

EXCLUDES: Modification work orders

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(2.03,8) = CF(28) * A(2.03,8)$

VARIABLES ARE:

CF(28) = Cost Factor, Engineering Changes
A(2.03,8) = Peculiar Support Production Cost

CELL NO: A (2.03.9)
DATE: _____

COST DATA SHEET

ITEM: ENGINEERING CHANGES, COMMON SUPPORT

COST DATA EXPRESSION:

Cost = (Cost Factor) x (Production, Common Support)

INCLUDES: Costs associated with official alterations made to a system while it is still in the manufacturing process.

EXCLUDES: Modification work orders

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(2.03,9) = CF(29) * A(2.03,9)$

VARIABLES ARE:

CF(29) = Cost Factor, Engineering Changes
A(2.03,9) = Common Support Production Cost

CELL NO: A (2.04,7)
DATE: _____

COST DATA SHEET

ITEM: SYSTEM TEST AND EVALUATION

COST DATA EXPRESSION:

Cost = (Quantity of Test Periods) x (Avg Cost per Period) x (Shift Factor)

INCLUDES: DT/OT III

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(2.04,7) = XN(117) * AC(97) * SF(4)$

VARIABLES ARE:

XN(117) = Quantity of Test Periods

AC(97) = Avg Cost per Period

SF(4) = Constant dollar shift factor, proc, wpn

CELL NO: A (2.05,7)
DATE: _____

COST DATA SHEET

ITEM: DATA - INVESTMENT

COST DATA EXPRESSION:

Cost = Thruput

INCLUDES:

Maintenance and Technical Publications/Manuals

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

A(2.05,7) = THRUPUT * SF(4)

VARIABLES ARE:

THRUPUT = (M FY xx \$)

SF(4) = Constant Dollar Shift Factor, Proc, WPN

CELL NO: A (2.06,7)
DATE: _____

COST DATA SHEET

ITEM: SYSTEM/PROJECT MANAGEMENT

COST DATA EXPRESSION:

Cost = (Quantity of Man Years) x (Avg Cost per Man Year) x (Shift Factor)

INCLUDES: Personnel and Overhead - Office - Project Management

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(2.06,7) = XN(133) * AC(113) * SF(4)$

VARIABLES ARE:

XN(133) = Quantity, Man Years

AC(113) = Avg Cost per Man Year

SF(4) = Constant Dollar Shift Factor, Proc, WPN

CELL NO: A (2.08,7)

DATE: _____

COST DATA SHEET

ITEM: TRAINING

COST DATA EXPRESSION:

Cost = Thruput

INCLUDES: Training devices and components

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(2.08,7) = \text{Thruput} * SF(4)$

VARIABLES ARE:

Thruput = (M FY xx \$)

SF(4) = Constant Dollar Shift Factor, Proc, WPN

CELL NO: A(2.09,1)

DATE: _____

COST DATA SHEET

ITEM: INITIAL SPARES/REPAIR PARTS (ISRP), FRAME

COST DATA EXPRESSION:

Cost = (Cost Factor %) x (Production Cost)

INCLUDES: Initial provisioning of spare components, subassemblies, and repair parts for Hull, Turret, Suspension, Partial Automotive

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(2.09,1) = CF(41) * A(2.02, 1)$

VARIABLES ARE:

CF(41) = Cost Factor, ISRP

A(2.02,1) = Frame Production Cost

CELL NO: A (2.09, 2)

DATE: _____

COST DATA SHEET

ITEM: INITIAL SPARES & REPAIR PARTS (ISRP), PROPULSION

COST DATA EXPRESSION:

Cost = (Cost Factor) X (Production Cost)

INCLUDES:

Engine and Transmission

EXCLUDES: Other power train components have been costed as part of the vehicle. See Cell A(2.09,1).

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(2.09,2) = CF(42) * A(2.02,2)$

VARIABLES ARE:

CF(42) = Cost Factor, ISRP

A(2.02,2) = Propulsion Production Cost

CELL NO: A (2.09,3)
DATE: _____

COST DATA SHEET

ITEM: INITIAL SPARES/REPAIR PARTS (ISRP) - COMMUNICATIONS EQUIPMENT

COST DATA EXPRESSION:

Cost = (Cost Factor %) x (Production Cost)

INCLUDES: Initial provisioning of spare components, subassemblies, and repair parts for communication equipment.

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(2.09,3) = CF(43) * A(2.02,3)$

VARIABLES ARE:

CF(43) = Cost Factor, ISRP

A(2.02,3) = Communications Equip Production Cost

CELL NO: A (2.09,4)

DATE: _____

COST DATA SHEET

ITEM: INITIAL SPARES/REPAIR PARTS (ISRP), FIRE CONTROL

COST DATA EXPRESSION:

Cost = (Cost Factor Z) X (Production Cost)

INCLUDES:

Initial provisioning of spare components, subassemblies and repair parts for fire control equipment.

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(2.09,4) = CF(44) * A(2.02,4)$

VARIABLES ARE:

CF(44) = Cost Factor, ISRP

A(2.02,4) = Fire Control Production Cost

CELL NO: A (2.09,5)

DATE: _____

COST DATA SHEET

ITEM: INITIAL SPARES/REPAIR PARTS (ISRP), ARMAMENT

COST DATA EXPRESSION:

Cost = (Cost Factor %) x (Production Cost)

INCLUDES: Whole gun initial spares

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(2.09,5) = CF(45) * A(2.02,5)$

VARIABLES ARE:

CF(45) = Cost Factor, ISRP

A(2.02,5) = Armament Production Cost

CELL NO: A (2.09,6)
DATE: _____

COST DATA SHEET

ITEM: INITIAL SPARES/REPAIR PARTS (ISRP), AMMUNITION

COST DATA EXPRESSION:

Cost = (Cost Factor %) x (Production Cost)

INCLUDES:

Initial provisioning of spare components, subassemblies and repair parts for ammunition.

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(2.09,6) = CF(46) * A(2.02,6)$

VARIABLES ARE:

CF(46) = Cost Factor, ISRP
A(2.02,6) = Ammunition Production Cost

CELL NO: A (2.09,7)
DATE: _____

COST DATA SHEET

ITEM: INITIAL SPARES/REPAIR PARTS (ISRP), OTHER

COST DATA EXPRESSION:

Cost = (Cost Factor %) x (Production Cost)

INCLUDES:

Initial provisioning of spare components, subassemblies and repair parts for other tracked vehicle related items.

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(2.09,7) = CF(47) * A(2.02,7)$

VARIABLES ARE:

CF(47) = Cost Factor, ISRP

A(2.02,7) = Other tracked vehicle related production cost

CELL NO: A (2.09,8)
DATE: _____

COST DATA SHEET

INITIAL SPARES/REPAIR PARTS (ISRP), PECULIAR SUPPORT

ITEM: EQUIPMENT

COST DATA EXPRESSION:

Cost = (Cost Factor Z) x (Production Cost)

INCLUDES:

Initial Provisioning of spare components, subassemblies and repair parts for peculiar support equipment.

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(2.09,8) = CF(48) * A(2.02,8)$

VARIABLES ARE:

CF(48) = Cost Factor, ISRP

A(2.02,8) = Peculiar support equipment

CELL NO: A (2.09,9)
DATE: _____

COST DATA SHEET

INITIAL SPARES/REPAIR PARTS (ISRP), COMMON SUPPORT

ITEM: EQUIPMENT

COST DATA EXPRESSION:

Cost = (Cost Factor %) x (Production Cost)

INCLUDES:

Initial provisioning of spare components, subassemblies and repair parts for common support equipment.

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(2.09,9) = CF(49) * A(2.02,9)$

VARIABLES ARE:

CF(49) = Cost Factor, ISRP
A(2.02,9) = Common support production cost

CELL NO: A (2.10,7)

DATE: _____

COST DATA SHEET

ITEM: TRANSPORTATION, TRACKED VEHICLE SYSTEM INCL ISRP

COST DATA EXPRESSION:

Cost = (Quantity of Tracked Vehicles) x (Avg Cost per Tracked Vehicles) x
(Shift Factor)

INCLUDES:

1st and 2nd destination transportation, end item tracked vehicle.

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(2.10,7) = XN(167) * AC(147) * SF(4)$

VARIABLES ARE:

XN(167) = Number of Tracked Vehicles

AC(147) = Average Cost, Transportation

SF(4) = Constant Dollar shift Factor, Proc, WPN

CELL NO: A (2.11,7)
DATE: _____

COST DATA SHEET

ITEM: OTHER, TRACKED VEHICLE

COST DATA EXPRESSION:

Cost = Thruput

INCLUDES:

Other investment costs not included elsewhere related to the tracked vehicle system.

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(2.11,7) = (\text{Thruput}) * SF(4)$

VARIABLES ARE:

Thruput (M FY xx \$)

SF(4) = Shift Factor, Proc, Wpn

CELL NO: A (2.11,10)
DATE: _____

COST DATA SHEET

ITEM: INVESTMENT - OTHER - SYSTEMS COMMON/OTHER

COST DATA EXPRESSION:

Cost = Thruput

INCLUDES:

Kits for water propulsion, self recovery, winterization and closure.

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(2.11,10) = \text{Thruput} * SF(4)$

VARIABLES ARE:

Thruput (M FY xx \$)
 $SF(4)$ = Constant dollar shift factor, Proc

CELL NO: A (3.01)

DATE: _____

COST DATA SHEET

ITEM: Military Personnel

COST DATA EXPRESSION:

Military Personnel = Crew pay and allowance + Maintenance Pay and Allowances + Indirect Pay and allowances + Permanent Change of Station.

INCLUDES: This element is the sum of Crew Pay Allowances (3.011), Maintenance Pay and Allowances (3.012), Indirect Pay and Allowances (3.013), and Permanent Change of Station (3.014).

EXCLUDES: The costs of depot maintenance personnel (see (3.031), costs of personnel in the replacement pipeline (see (3.061), and the overhead for Transients, Patients and Prisoners (see (3.062).

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$$A(3.01) = A(3.011) + A(3.012) + A(3.013) + A(3.014)$$

VARIABLES ARE:

CELL NO: A (3.011.7)
DATE: _____

COST DATA SHEET

ITEM: CREW PAY AND ALLOWANCES, TRACKED VEHICLE SYSTEM RELATED

COST DATA EXPRESSION:

Cost = (Quantity of Authorized Operational Equipment) x (Authorized Number of Crewmen per Operational Equipment) x (Basic Pay and Allowances, theater and special pay per crewman) X (Number of operating years) X (Constant dollar shift factor, MPA)

INCLUDES: Basic Pay, BAQ, BAS and Theatre Pay and special pay (if any) for Tracked Vehicle Crewmen.

EXCLUDES: PCS and costs of those who operate other Equipment in the Force Unit such as Trucks and Switchboards.

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$$A(3.011,7) = XN(187) * XN(191) * (AC(256) + AC(262)) + AC(268)) * YN(5) * SF(8)$$

VARIABLES ARE:

XN(187) = Total Authorized Quantity Operational Equipment
XN(191) = Number Authorized Crewmen per Operational Equipment
AC(256) = Avg Annual Basic P&A per Crewman
AC(262) = Avg Annual Theatre Cost per Crewman
YN(5) = Number of Operating Years
SF(8) = Constant Dollar Shift Factor, MPA
AC(268) = Avg Special Pay per Crewman

CELL NO: A (3.011,10)
DATE: _____

COST DATA SHEET

ITEM: CREW PAY AND ALLOWANCES, BATTALION RELATED

COST DATA EXPRESSION:

Cost = (Quantity of Authorized Operational Equipment) x (authorized Number of Crewman per Operational Equipment) x (Basic Pay and Allowances, Theatre, and special Pay per Crewman) x (Number of Operating Years) x (Constant Dollar Shift Factor, MPA)

INCLUDES: Basic Pay, BAQ, BAS and Theatre Pay and special pay (if any) for crewmen other than the Tracked Vehicle System Related Crewman.

EXCLUDES: PCS

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.011,10) = XN(190) * XN(192) * (AC(257) + AC(263) + AC(269)) * YN(5) * SF(8)$

VARIABLES ARE:

XN(190) = Total Authorized Quantity Operational Equipment
XN(192) = Number Authorized Crewmen per Operational Equipment
AC(257) = Avg Annual Basic P&A per Crewman
AC(263) = Avg Annual Theatre Cost per Crewman
YN(5) = Number of Operating Years
SF(8) = Constant Dollar Shift Factor, MPA
AC(269) = Avg Special Pay per Crewman

CELL NO: A (3.012,7)
DATE: _____

COST DATA SHEET

ITEM: MAINTENANCE PAY AND ALLOWANCES, TRACKED VEHICLE SYSTEM RELATED

COST DATA EXPRESSION:

Cost = (Number of Authorized Operational Equipment) x (Number of Maintenance men Authorized per Operational Equipment) x (Basic Pay and Allowances, Theatre and special Pay) x (Number of Operating Years) x (Constant Dollar Shift Factor, MFA)

INCLUDES: Basic Pay, BAQ, BAS and Theatre Pay and special pay (if any) for Tracked Vehicle System Oriented Maintenance men.

EXCLUDES: PCS and Costs of those whose Primary Function is to Maintain other Equipment in the Force Unit such as Trucks and Switchboards

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$$A(3.012,7) = XN(187) * XN(193) * (AC(258) + AC(264) + AC(270)) * YN(5) * SF(8)$$

VARIABLES ARE:

XN(187) = Total Authorized Quantity Operational Equipment
XN(193) = Number Authorized Maintenance Men per Operational Equipment
AC(258) = Avg Annual Basic P&A per Maintenance Man
AC(264) = Avg Annual Theatre Cost per Maintenance Man
YN(5) = Number of Operating Years
SF(8) = Constant Dollar Shift Factor, MPA
AC(270) = Avg Annual Special Pay per Maintenance Man

CELL NO: A (3.012.10)

DATE: _____

COST DATA SHEET

ITEM: MAINTENANCE PAY AND ALLOWANCES. BATTALION RELATED

COST DATA EXPRESSION:

Cost = (Number of Authorized Operational Equipment) x (Number of Maintenance men Authorized per Operational Equipment) x (Basic Pay and Allowances, Theatre and Special Pay) x (Number of Operating Years) x (Constant Dollar Shift Factor, MPA)

INCLUDES: Basic Pay, BAQ, BAS and Theatre Pay and special pay (if any) for Maintenance Men other than the Tracked Vehicle System Related Maintenance Men.

EXCLUDES: PCS

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.012,10) = XN(190) * XN(194) * (AC(259) + AC(265) + AC(271)) * YN(5) * SF(8)$

VARIABLES ARE:

XN(190) = Total Authorized Quantity Operational Equipment
XN(194) = Number Authorized Maintenance Men per Operational Equipment
AC(259) = Avg Annual Basic P&A per Maintenance Man
AC(265) = Avg Annual Theatre Cost per Maintenance Man
YN(5) = Number of Operating Years
SF(8) = Constant Dollar Shift Factor, MPA
AC(271) = Avg Annual Special Pay per Maintenance Man

CELL NO: A (3.013,7)
DATE: _____

COST DATA SHEET

ITEM: INDIRECT PAY AND ALLOWANCES, TRACKED VEHICLE SYSTEM RELATED

'COST DATA EXPRESSION:

Cost = (Number of Authorized Operational Equipment) x (Number of Authorized Indirect Men per Authorized Equipment) x (Basic Pay and Allowances Plus Theatre Pay per Indirect Man) x (Number of Operating Years) x (Constant Dollar Shift Factor, MPA)

INCLUDES: Basic pay, BAQ, BAS and theatre pay and special pay (if applicable) for remainder of indirect tracked vehicle personnel where tracked vehicle is in a mixed force battalion, utilize ratio of your interested system to total surface vehicles in battalion. Examples would include maintenance men for a wrecker which is used as tracked vehicle recovery vehicle.

EXCLUDES: PCS

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.013,10) = XN(187) * XN(195) * (AC(260) + AC(266)) * YN(5) * SF(8)$

VARIABLES ARE:

XN(187) = Total authorized quantity operational equipment
XN(195) = Number authorized indirect men per authorized operational equipment
AC(260) = Average annual basic P&A per indirect man
AC(266) = Average annual theatre cost per indirect man
YN(5) = Number of operating years
SF(8) = Constant Dollar Shift Factor, MPA

CELL NO: A G.013,10
DATE: _____

COST DATA SHEET

ITEM: INDIRECT PAY AND ALLOWANCES, BATTALION RELATED

COST DATA EXPRESSION:

Cost = (Number of Authorized Operational Equipment) x (Number of Authorized Indirect Men per Authorized Equipment) x (Basic Pay and Allowances Plus Theatre Pay per Indirect Man) x (Number of Operating Years) x (Constant Dollar Shift Factor, MPA)

INCLUDES: Basic pay, BAQ, BAS and theatre pay and special pay (if applicable) for DS and GS maintenance men and crew (if any) for remainder of tracked vehicle battalion TOE. Where tracked vehicle is in a mixed force battalion, utilize ratio of your interested system to total surface vehicles in battalion.

EXCLUDES: PCS, Incentive and Special Pay

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.013,10) = XN(190) * XN(196) * (AC(261) + AC(267)) * YN(5) * SF(8)$

VARIABLES ARE:

XN(190) = Total authorized quantity operational equipment
XN(196) = Number authorized indirect men per authorized operational equipment
AC(261) = Average annual basic P&A per indirect man
AC(267) = Average annual theatre cost per indirect man
YN(5) = Number of operating years
SF(8) = Constant Dollar Shift Factor, MPA

CELL NO: A (3.014,7)

DATE: _____

COST DATA SHEET

ITEM: PERMANENT CHANGE OF STATION, TRACKED VEHICLE SYSTEM RELATED

COST DATA EXPRESSION:

Cost = (Number of Authorized Operational Equipment) x (Number of Authorized Personnel per Equipment) x (Average Annual PCS Cost per Man) x (Number of Operating Years)

INCLUDES: PCS Travel paid to and from overseas theatre and within CONUS from MPA Appropriation.

EXCLUDES: Battalion related personnel PCS cost

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.014,7) = XN(187) * (XN(191) + XN(193) + XN(195)) * AC(274) * YN(5) * SF(8)$

VARIABLES ARE:

XN(187) = Total Authorized Quantity Operational Equipment
XN(191) = Number Authorized Crewmen per System Operational Equipment
XN(193) = Number Authorized Maintenance Men per System Operational Equipment
AC(274) = Avg Annual PCS Cost per Man
YN(5) = Number of Operating Years
SF(8) = Constant Dollar Shift Factor, MPA
XN(195) = Number Authorized Indirect Men per Operational Equipment

CELL NO: A 3.014,10
DATE: _____

COST DATA SHEET

ITEM: PERMANENT CHANGE OF STATION, BATTALION RELATED

COST DATA EXPRESSION:

Cost = (Number of Authorized Operational Equipment) x (Number of Authorized Personnel per Equipment) x (Average Annual PCS Cost per Man) x (Number of Operating Years) x (Constant Dollar Shift Factor, MPA)

INCLUDES: PCS Travel to and from overseas theatre and within CONUS paid from MPA Appropriation.

EXCLUDES: Tracked Vehicle personnel PCS cost

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.014,10) = XN(190) * XN(192) + XN(194) + XN(196)) * AC(275) * YN(5) * SF(8)$

VARIABLES ARE:

XN(190) = Total authorized quantity operational equipment
XN(196) = Number of indirect men per operational equipment
AC(275) = Average annual PCS cost per man
YN(5) = Number of operating years
SF(8) = Constant Dollar Shift Factor, MPA
XN(192) = Number of crewmen per operational equipment
XN(194) = Number of maintenance men per operational equipment

CELL NO: A (3.02)
DATE: 19 Feb 76

COST DATA SHEET

ITEM: Consumption

COST DATA EXPRESSION:

Cost = Summation

INCLUDES: This element is the sum of the costs of Replenishment Spares (3.021), Petroleum, Oil and Lubricants (3.022) and Unit Training, Ammunition and Missiles (3.023).

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.02) = A(3.021) + A(3.022) + A(3.023)$

VARIABLES ARE:

CELL NO: A (3.021,1)
DATE: _____

COST DATA SHEET

ITEM: REPLENISHMENT SPARES, FRAME

COST DATA EXPRESSION:

Cost = (Number of operational equipment) x (Annual miles per equipment) x
(Replenishment spares cost per mile) x (Number of operating years) x
(Shift Factor)

INCLUDES: Replenishment spares cost of all parts assemblies, and components consumed at organizational, direct support, and general support levels for frame and propulsion components.

EXCLUDES: Depot level.

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.021,1) = XN(181) * XN(201) * (AC(151) / 1 \text{ MIL}) * YN(5) * SF(7)$

VARIABLES ARE:

XN(181) = Total quantity of operational equipment
XN(201) = Annual activity rate per equipment
AC(151) = Replenishment spares rate per mile, frame and propulsion
YN(5) = Number of operating years
SF(7) = Constant Dollar Shift Factor, OMA

CELL NO: A (3.021,2)
DATE: _____

COST DATA SHEET

ITEM: REPLENISHMENT SPARES, PROPULSION

COST DATA EXPRESSION:

Cost = (Number of operational equipment) x (Annual miles per equipment) x
(Replenishment spares cost per mile) x (Number of operating years) x
(Shift Factor)

INCLUDES: Included in Cell A(3.021,1)

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

A(3.021,2) = XN(182)*XN(202)*(AC(152)/1 MIL)*YN(5)*SF(7)

VARIABLES ARE:

XN(182) = Total quantity of operational equipment
XN(202) = Annual activity rate per equipment
AC(152) = Replenishment spares rate per mile
YN(5) = Number of operating years
SF(7) = Constant Dollar Shift Factor, OMA

CELL NO: A (3.021,3)

DATE: _____

COST DATA SHEET

ITEM: REPLENISHMENT SPARES, COMMUNICATION EQUIPMENT

COST DATA EXPRESSION:

Cost = (Cost Factor) x (Average Production Cost per Operational Equipment) x
(Number of Operational Equipment) x (Number of Operating Years) x
(Shift Factor)

INCLUDES: Replenishment spares cost of all parts, assemblies, and components consumed at organizational, direct support, and general support levels.

EXCLUDES: Depot level

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.021,3) = XN(183) * XN(203) * (AC(153) / 1000000) * YN(5) * SF(7)$

VARIABLES ARE:

XN(183) = Total quantity of operational equipment
XN(203) = Cost Factor, Replenishment Spares = .05
AC(153) = Average Production Cost per Operational Equipment
YN(5) = Number of operating years
SF(7) = Shift factor, OMA

CELL NO: A (3.021,4)
DATE: _____

COST DATA SHEET

ITEM: REPLENISHMENT SPARES, FIRE CONTROL

COST DATA EXPRESSION:

Cost = (Cost Factor) x (Average Production Cost per Operational Equipment) x
(Number of Operational Equipment) x (Number of Operating Years) x
(Shift Factor)

INCLUDES: Replenishment spares cost of all parts assemblies and components consumed at organizational, direct support and general support levels.

EXCLUDES: Depot level.

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.021,4) = XN(184) * XN(204) * (AC(154) / 1000000) * YN(5) * SF(7)$

VARIABLES ARE:

XN(184) = Total quantity of operational equipment
XN(204) = Cost Factor, replenishment spares
AC(154) = Average production cost per operational equipment
YN(5) = Number of operating years
SF(7) = Shift Factor, OMA

CELL NO: A (3.021,5)
DATE: _____

COST DATA SHEET

ITEM: REPLENISHMENT SPARES, ARMAMENT

COST DATA EXPRESSION:

$$\text{Cost} = \sum_{i=1}^n [(\text{Annual Replenishment Spares Cost}) \times (\text{Number of Weapons per Operational Equipment})] \times (\text{Number of Operational Equipment}) \times (\text{Number of Operating Years}) \times (\text{Shift Factor})$$

INCLUDES:

Replenishment spares cost of all parts, assemblies, and components consumed at organizational, direct support, and general support levels.

EXCLUDES: Depot level

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$$A(3.021,5) = XN(185) * (AC(155)/1 \text{ MIL}) * YN(5) * SF(7)$$

VARIABLES ARE:

XN(185) = Number of operational equipment
AC(155) = Annual weapon replenishment spares cost per operational equipment
YN(5) = Number of operating years.
SF(7) = Constant dollar shift factor, OMA

CELL NO: A (3.021,6)
DATE: _____

COST DATA SHEET

ITEM: REPLENISHMENT SPARES, AMMUNITION

COST DATA EXPRESSION:

Cost = (Number of operational equipment) x (Annual miles per equipment) x
(Replenishment spares cost per mile) x (Number of operating years) x
(Shift Factor)

INCLUDES: Annual procurement costs of repair parts and secondary items.

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.021,6) = XN(186) * XN(206) * (AC(156) / 1000000) * YN(5) * SF(7)$

VARIABLES ARE:

XN(186) = Total quantity of operational equipment
XN(206) = Annual activity rate per equipment
AC(156) = Replenishment spares rate per mile
YN(5) = Number of operating years
SF(7) = Constant Dollar Shift Factor, OMA

CELL NO: A (3.021,7)
DATE: _____

COST DATA SHEET

ITEM: REPLENISHMENT SPARES, TRACKED VEHICLE SYSTEM RELATED

COST DATA EXPRESSION:

Cost = (Number of operational equipment) x (Annual miles per equipment) x
(Replenishment spares cost per mile) x (Number of operating years) x
(Shift Factor)

INCLUDES: Annual procurement costs of repair parts and secondary items. Not included else where for the Tracked Vehicle System.

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.021,7) = XN(187) * XN(207) * (AC(157) / LMIL) * YN(5) * SF(7)$

VARIABLES ARE:

XN(187) - Total quantity of operational equipment
XN(207) - Annual activity rate per equipment
AC(157) - Replenishment spares rate per mile
YN(5) - Number of operating years
SF(7) - Constant dollar shift factor, OMA

CELL NO: A (3.021,9)

DATE: _____

COST DATA SHEET

ITEM: CONSUMPTIONS - REPLENISHMENT SPARES

COST DATA EXPRESSION:

Thruput - Cost Factor x Production Cost x Operating Years.

INCLUDES:

This element includes the costs of all parts, assemblies, subassemblies, components, special tools, and test sets consumed in repair and overhaul at each level of maintenance except depot. Costs of parts and subassemblies, required as a result of losses to the Army supply system caused by accidents, accrued wear and tear, shrinkage and deterioration reaching an uneconomical repairable status will also be included. Costs resulting from the loss of end items will not be included in this category if the end items are costed as additional procurement in the investment phase.

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.021,9) = 0.64 * A(2.02) * YN(5) * SF(7)$

VARIABLES ARE:

A(2.02) - Production costs
UN(5) - Number of operating costs
SF(7) - Constant dollar shift factor, OMA

CELL NO: A (3.021,10)

DATE: _____

COST DATA SHEET

ITEM: REPLENISHMENT SPARES, BATTALION RELATED

COST DATA EXPRESSION:

Cost = (Number of operational equipment) x (Annual miles per equipment) x
(Replenishment spares cost per mile) x (Number of operating years) x
(Shift factor)

INCLUDES: Annual procurement costs of repair parts and secondary items.

EXCLUDES: All tracked vehicle system replenishment spares cost.

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.021,10) = XN(190) * XN(210) * (AC(160)/1 \text{ mil}) * YN(5) * SF(7)$

VARIABLES ARE:

XN(190) = Total quantity of operational equipment
XN(210) = Annual activity rate per equipment
AC(160) = Replenishment spares rate per mile
YN(5) = Number of operating years
SF(7) = Constant Dollar, Shift Factor, OMA

CELL NO: A (3.022,7)

DATE: _____

COST DATA SHEET

ITEM: PETROLEUM, OIL AND LUBRICANTS (POL), TRACKED VEHICLE SYSTEM RELATED

COST DATA EXPRESSION:

Cost = (Number of operational equipment) x (Annual activity rate per equipment) x (POL cost per mile) x (Number of operating years) x (Shift Factor)

INCLUDES: POL consumption for the tracked vehicle system

EXCLUDES: POL consumption for the battalion

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.022,7) = XN(187) * XN(207) * (AC(167)/1 \text{ MIL}) * YN(5) * SF(7)$

VARIABLES ARE:

XN(187) = Total quantity of operational equipment
XN(207) = Annual activity rate per equipment
AC(167) = POL cost per mile
YN(5) = Number of operating years
SF(7) = Constant Dollar Shift Factor, OMA

CELL NO: A (3.022,10)

DATE: _____

COST DATA SHEET

ITEM: PETROLEUM, OIL AND LUBRICANTS (POL), BATTALION RELATED

COST DATA EXPRESSION:

Cost = (Number of operational equipment) x (Annual activity rate per equipment) x (POL cost per mile) x (Number of operating years) x (Shift Factor)

INCLUDES: POL consumption for the battalion

EXCLUDES: POL consumption for the tracked vehicle system

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.022,9) = XN(190) * XN(210) * (AC(170)/1 \text{ MIL}) * YN(5) * SF(7)$

VARIABLES ARE:

XN(190) = Total quantity of operational equipment
XN(210) = Annual activity rate per equipment
AC(170) = POL cost per mile
YN(5) = Number of operating years
SF(7) = Constant Dollar Shift Factor, OMA

CELL NO: A (3.023,6)
DATE: _____

COST DATA SHEET

ITEM: CONSUMPTION - UNIT TRAINING AMMO

COST DATA EXPRESSION:

Cost = (Number of Operational Equipment) * (Average Cost/Veh) * (Number of Operating Years) * (Shift Factor)

INCLUDES: This element includes the cost of ammunition consumed by MICV system during unit training.

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.023,6) = XN(190) * AC(250) * YN(5) * SF(5)$

VARIABLES ARE:

XN(190) = No. of vehicles
AC(250) = Annial cost of ammo used
YN(5) = Number of operating years
SF(5) = Shift Factor for Proc Ammo

AD-A044 157

OFFICE OF THE COMPTROLLER OF THE ARMY WASHINGTON D C --ETC F/O 14/1
ARMY LIFE CYCLE COST MODEL FOR TRACKED VEHICLE SYSTEMS, (U)
JUL 77 M J MARRONE, W S CLOUGH, E H MILER

UNCLASSIFIED

DCA-R-50

NL

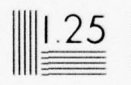
2 OF 2

AD
A044157

END
DATE
FILMED

10-77

DOC



8.0
7.1
6.3
5.6
5.0
4.5
4.0
3.6
3.2
2.8
2.5
2.2
2.0
1.8
1.6
1.4
1.25
1.1
1.0



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

CELL NO: A (3.023,7)
DATE:

COST DATA SHEET

ITEM: UNIT TRAINING, AMMUNITION AND MISSILES, TRACKED VEHICLE SYSTEM RELATED

COST DATA EXPRESSION:

Cost = (Number of operational equipment) x (Annual ammo/msl cost per equipment) x (Number of operating years) x (Shift Factor)

INCLUDES: Cost of ammunition fired during Annual Service Practice (ASP)

EXCLUDES: Missile Cost

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.023,7) = XN(187) * (AC(247) / 1 \text{ MIL}) * YN(5) * SF(5)$

VARIABLES ARE:

XN(187) = Total quantity of operational equipment
AC(247) = Annual ammo/msl cost per equipment
YN(5) = Number of operating years
SF(5) = Constant Dollar Shift Factor, Proc, Ammo

CELL NO: A (3.023,10)

DATE: _____

COST DATA SHEET

ITEM: UNIT TRAINING, AMMUNITION AND MISSILES, BATTALION RELATED

COST DATA EXPRESSION:

Cost = (Number of operational equipment) x (Annual ammo/msl cost per equipment) x (Number of operating years) x (Shift Factor)

INCLUDES: Cost of ammunition fired during Annual Service Practice (ASP)

EXCLUDES: Missile Cost

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.023,10) = XN(190) * (AC(250)/1 \text{ MIL}) * YN(5) * SF(5)$

VARIABLES ARE:

XN(190) = Total quantity operational equipment
AC(250) = Annual Ammo/Missile Cost per Equipment
YN(5) = Number of operating years
SF(5) = Constant Dollar Shift Factor, Proc, Ammo

CELL NO: A (3.03)
DATE: _____

COST DATA SHEET

ITEM: Depot Maintenance - Labor & Materiel & Transportation

COST DATA EXPRESSION:

Cost = Summation

INCLUDES: This element includes the sum of Labor (3.031), Materiel (3.032), and Transportation (3.033) costs for the repair and overhaul of items at Depot Maintenance.

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.03) = A(3.031) + A(3.032) + A(3.033)$

VARIABLES ARE:

CELL NO: A (3.031,1)
DATE: _____

COST DATA SHEET

ITEM: DEPOT MAINT - LABOR & MATERIEL - FRAME

COST DATA EXPRESSION:

Cost = (Frequency of Overhauls)*(Number of Operational Equipment Vehicles)*
(Cost per Overhaul)*(Shift Factor)

INCLUDES: Labor costs for repair and overhaul of the Tracked Vehicle System and battalion related equipment at the depot level.

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.031,1) = (XN(201)*YN(5)/PC(11)-1)*XN(181)*AC(171)*SF(7)$

VARIABLES ARE:

XN(201) = Yearly Activity Rate
PC(11) = Activity Between Overhauls
XN(181) = Quantity of Frames
AC(171) = Cost per Overhaul \$/OH
SF(7) = Shift factor
OMA

CELL NO: A (3.031,2)
DATE: _____

COST DATA SHEET

ITEM: DEPOT MAINT - LABOR & MATERIEL - PROPULSION

COST DATA EXPRESSION:

Cost = (Frequency of Overhauls)*(Number of Operational Equipment)*
(Cost per Overhaul)*(Shift Factor)

INCLUDES: Engine, transmission and final drive, labor costs for repair
and overhaul at depot level

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.031,2) = (XN(202)*YN(5)/PC(12)^{-1}*XN(182)*AC(172)*SF(7)$

VARIABLES ARE:

XN(202) = Yearly Activity miles
PC(12) = Activity Between Overhauls miles
XN(182) = Quantity of above
AC(172) = Cost per Overhaul \$/OH
SF(7) = Shift Factor

CELL NO: A (3.031.3)
DATE: _____

COST DATA SHEET

ITEM: DEPOT MAINT - LABOR AND MATERIEL - GUID CONTROL/COMMUNICATIONS

COST DATA EXPRESSION:

Cost = (Frequency of Overhaul)*(Number of Operational Equipment)*
(Cost per Overhaul)*(Shift Factor)

INCLUDES:

Communications Equipment labor costs for repair and overhaul at the depot level

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.031,3) = (XN(203)*YN(5) / PC(13))^{-1} * XN(183) * AC(173) * SF(7)$

VARIABLES ARE:

XN(203) = Yearly Activity
PC(13) = Activity between Overhauls
XN(183) = Quantity
AC(173) = Labor Cost/OH
YN(5) = Number of operating years
SF(7) = Shift Factor

CELL NO: A (3,031,5)
DATE: _____

COST DATA SHEET

ITEM: DEPOT MAINTENANCE - LABOR - ARMAMENT

COST DATA EXPRESSION:

Cost = (Frequency of Overhaul)*(Number of Operational Equipment)*
(Cost per Overhaul)*(Shift Factor)

INCLUDES:

Labor costs for repair and overhaul of armament components at the depot level

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.031,5) = (XN(204)*YN(5))^{ -1} / PC(15) * XN(185) * AC(175) * SF(7)$

VARIABLES ARE:

XN(205) = Yearly Activity
PC(15) = Activity between Overhauls
XN(185) = Quantity
AC(175) = Labor Cost/OH
YN(5) = Number of operating years
SF = Shift Factor

CELL NO: A (3.031,7)

DATE: _____

COST DATA SHEET

ITEM: DEPOT MAINTENANCE LABOR, TRACKED VEHICLE SYSTEM RELATED

COST DATA EXPRESSION:

Cost = (Total quantity operational equipment) x [(Annual activity rate) x
(Number operating years)/Average activity between overhauls]-1] x
(Labor cost per overhaul) x (Shift Factor)

INCLUDES: Military and civilian labor for the repair and overhaul of the tracked vehicle system at the depot level.

EXCLUDES: Depot maintenance materiel and transportation costs.

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.031,7) = (XN(207)*YN(5)/PC(17)-1)*XN(187)*AC(177)*SP(7)$

VARIABLES ARE:

XN(187) = Number of operational equipment
YN(5) = Number of operating years
PC(17) = Average activity between overhauls
XN(207) = Annual activity rate
AC(177) = Labor cost per overhaul
SF(7) = Constant Dollar Shift Factor, OMA

CELL NO: A (3.031,10)

DATE: _____

COST DATA SHEET

ITEM: DEPOT MAINTENANCE LABOR, BATTALION RELATED

COST DATA EXPRESSION:

Cost = (Total quantity operational equipment) x [(Annual activity rate) x
(Number operating years)/Average activity between overhauls]-1] x
(Labor cost per overhaul) x (Shift Factor)

INCLUDES: Military and civilian labor and materiel for the repair and overhaul of the battalion related equipment at the depot level.

EXCLUDES: Depot maintenance transportation costs.

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

A(3.031,10) = (XN(210)*YN(5)/PC(20)-1)*XN(190)*AC(180)*SP(7)

VARIABLES ARE:

XN(190) = Number of operational equipment
YN(5) = Number of operating years
PC(20) = Average activity between overhauls
XN(210) = Annual activity rate
AC(180) = Labor and Materiel Cost per Overhaul
SF(7) = Constant Dollar Shift Factor, OMA

CELL NO: A (3.032.7)
DATE: _____

COST DATA SHEET

ITEM: DEPOT MAINTENANCE MATERIEL, TRACKED VEHICLE SYSTEM RELATED

COST DATA EXPRESSION:

Cost = (Total quantity operational equipment) x [(Annual activity rate) x
(number operating years) / Average activity between overhauls - 1] x
(Materiel cost per overhaul) x (shift factor)

INCLUDES: Materiel cost for the repair and overhaul of the tracked
vehicle system at the depot leve.

EXCLUDES: Depot maintenance labor and transportation costs.

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.032,7) = (XN(207) * YN(5) / PC(17) - 1) * XN(187) * AC(187) * SF(4)$

VARIABLES ARE:

XN(187) = Number of operational equipment
YN(5) = Number of operating years
PC(17) = Average activity between overhauls
XN(207) = Annual activity rate
AC(187) = Materiel cost per overhaul
SF(4) = Constant dollar shift factor, Wpn

CELL NO: A (3.032,10)

DATE: _____

COST DATA SHEET

ITEM: DEPOT MAINTENANCE MATERIEL. BATTALION RELATED

COST DATA EXPRESSION:

Cost = Included in Cell A(3.031,10)

Cost = (Total quantity operational equipment) x [(Annual activity rate) x
(Number operating years)/Average activity between overhauls]-1] x
(Materiel cost per overhaul) x (Shift Factor)

INCLUDES:

Included in Cell A(3.031,10)

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

A(3.032,10) = Included in Cell A(3.031,10)

A(3.032,10) = (XN(210)*YN(5)/PC(20)-1*XN(190)*AC(190)*SF(4)

VARIABLES ARE:

XN(190) = Number of operational equipment

YN(5) = Number of operating years

PC(20) = Average activity between overhauls

XN(210) = Annual activity rate

AC(190) = Materiel cost per overhaul

SF(4) = Constant Dollar Shift Factor, Pema, WPN

CELL NO: A (3.033,1)

DATE: _____

COST DATA SHEET

ITEM: DEPOT MAINTENANCE - TRANSPORTATION

COST DATA EXPRESSION:

Cost = (Frequency of Overhauls)*(Quantity of Operational Equipment)*
(Gross Weight-tons)*(Distance)*(Cost per Ton-mile)*(Number of
Years)*(Shift factor)

INCLUDES: Transportation costs of frome

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.033,1) = (XN(201)*YN(5) / PC(11))^{-1} * XN(181) * PC(21) * PC(31) * AC(191) / mil * SF(7)$

VARIABLES ARE:

XN(201) = Yearly Activity
PC(11) = Activity between OH
XN(181) = Quantity
PC(21) = Transportation Tons
PC(31) = Transportation Distance
AC(191) = Cost/ton mile

CELL NO: A (3.033,2)
DATE: _____

COST DATA SHEET

ITEM: DEPOT MAINTENANCE - TRANSPORTATION

COST DATA EXPRESSION:

Cost = (Frequency of Overhauls)*(Quantity of Operational Equipment)*
(Gross Weight-tons)*(Distance)*(Cost per ton-mile)*(Number of
years)*(Shift Factor)

INCLUDES: Transportation of engine, transportation and final drive.

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.033,2) = (XN(202)*YN(5)/PC(12)^{-1})*XN(182)*PC(22)*PC(32)*AC(192)/mil*SF(7)$

VARIABLES ARE:

XN(202) = Yearly Activity
PC(12) = Activity between OH
XN(182) = Quantity
PC(22) = Transportation Tons
PC(32) = Transportation Distance
AC(192) = Cost/ton mile

CELL NO: A (3.033,7)
DATE: _____

COST DATA SHEET

DEPOT MAINTENANCE TRANSPORTATION, TRACKED VEHICLE SYSTEM RELATED

ITEM: RELATED (to be specified)

COST DATA EXPRESSION:

Cost = (Total quantity operational equipment) x [(Annual activity rate) x
(Number operating years)/Average activity between overhauls]-1] x
(Shipping weight in tons per equipment) x (Average round trip distance
to depot) x (Transport costs per ton-mile) x (Shift Factor)

INCLUDES: Cost of transportation to depot maintenance facilities and
back to operational units.

EXCLUDES: First and second destination transportation.

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.033,7) = (XN(207) * YN(5) / PC(17) - 1) * XN(187) * PC(27) * PC(37) * AC(197) / 1 \text{ mil} * SF(7)$

VARIABLES ARE:

XN(207) = Activity rate per year in miles
YN(5) = Number of operating years
PC(17) = Average miles between overhauls
XN(187) = Total quantity of operational equipment
PC(27) = Shipping weight in tons per equipment
PC(37) = Average round trip distance to depot in miles
AC(197) = Transport costs per ton-mile
SF(7) = Constant Dollar Shift Factor, OMA

CELL NO: A (3.04,1)

DATE: _____

COST DATA SHEET

ITEM: MODIFICATIONS, FRAME

COST DATA EXPRESSION:

Cost = (Annual Modification Factor) x (Production Cost) x (Number of Operating Years)

INCLUDES: Modification work orders, retrofit, conversion, remanufacture, or engineering changes after acceptance by the Army.

EXCLUDES: Labor costs for above modifications and costs of program and product improvement offices (if any).

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.04,1) = CF(61) * A(2.01,1) * YN(5)$

VARIABLES ARE:

CF(61) = Annual modification factor

A(2.01,1) = Frame production cost

YN(5) = Number of operating years

CELL NO: A (3.033,10)

DATE: _____

COST DATA SHEET

ITEM: DEPOT MAINTENANCE TRANSPORTATION, BATTALION RELATED

COST DATA EXPRESSION:

Cost = (Total quantity operational equipment) x [(Annual activity rate) x
(Number operating years)/Average activity between overhauls-1] x
(Shipping weight in tons per equipment) x (Average round trip
distance to depot) x (Transport costs per ton-mile) x (Shift Factor)

INCLUDES: Cost of transportation to depot maintenance facilities and
back to operational units

EXCLUDES: First and second destination transportation

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.033,10) = (XN(210)*YN(5)/PC(20)-1)*XN(190)*PC(30)*PC(40)*AC(200)/1 \text{ mil}*SF($

VARIABLES ARE:

XN(210) = Activity rate per year in miles
YN(5) = Number of operating years
PC(20) = Average miles between overhauls
XN(190) = Total quantity of operational equipment
PC(30) = Shipping weight in tons per equipment
PC(40) = Average round trip distance to depot in miles
AC(200) = Transport costs per ton-mile
SF(7) = Constant Dollar Shift Factor, OMA

CELL NO: A (3.04,2)
DATE: _____

COST DATA SHEET

ITEM: MODIFICATIONS, PROPULSION

COST DATA EXPRESSION:

Cost = (Annual Modification Factor) x (Production Cost) x (Number of Operating Years)

INCLUDES: Modification work orders, retrofit, conversion, remanufacture, or engineering changes after acceptance by the Army.

EXCLUDES: Labor costs for above modifications and costs of program and product improvement offices (if any).

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.04,2) = CF(62) * A(2.01,2) * YN(5)$

VARIABLES ARE:

CF(62) = Annual modification factor
A(2.01,2) = Propulsion production cost
YN(5) = Number of operating years

CELL NO: A (3.04,3)

DATE: _____

COST DATA SHEET

ITEM: MODIFICATIONS, COMMUNICATIONS EQUIPMENT

COST DATA EXPRESSION:

Cost = (Annual Modification Factor) x (Production Cost) x (Number of Operating Years)

INCLUDES: Modification work orders, retrofit, conversion, remanufacture, or engineering changes after acceptance by the Army.

EXCLUDES: Labor costs for above modifications and costs of program and product improvement offices (if any).

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.04,3) = CF(63) * A(2.01,3) * YN(5)$

VARIABLES ARE:

CF(63) = Annual modification factor

A(2.01,3) = Communications equipment production cost

YN(5) = Number of operating years

CELL NO: A (3.04,4)
DATE:

COST DATA SHEET

ITEM: MODIFICATIONS, FIRE CONTROL

COST DATA EXPRESSION:

Cost = (Annual Modification Factor) x (Production Cost) x (Number of Operating Years)

INCLUDES: Modification work orders, retrofit, conversion, remanufacture, or engineering changes after acceptance by the Army.

EXCLUDES: Labor costs for above modifications and costs of program and product improvement offices (if any).

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.04,4) = CF(64) * A(2.01,4) * YN(5)$

VARIABLES ARE:

CF(64) = Annual modification factor
A(2.01,4) = Fire control production cost
YN(5) = Number of Operating Years

CELL NO: A (3.04,5)

DATE: _____

COST DATA SHEET

ITEM: MODIFICATIONS, ARMAMENT

COST DATA EXPRESSION:

Cost = (Annual Modification Factor) x (Production Cost) x (Number of Operating Years)

INCLUDES: Modification work orders, retrofit, conversion, remanufacture, or engineering changes after acceptance by the Army.

EXCLUDES: Labor costs for above modifications and costs of program and product improvement offices (if any).

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.04,5) = CF(65) * A(2.01,5) * YN(5)$

VARIABLES ARE:

CF(65) = Annual modification factor
A(2.01,5) = Armament production cost
YN(5) = Number of operating years

CELL NO: A (3.04,6)
DATE: _____

COST DATA SHEET

ITEM: MODIFICATIONS, AMMUNITION

COST DATA EXPRESSION:

Cost = (Annual Modification Factor) x (Production Cost) x (Number of Operating Years)

INCLUDES: Modification work orders, retrofit, conversion, remanufacture, or engineering changes after acceptance by the Army.

EXCLUDES: Labor costs for above modifications and costs of program and product improvement offices (if any).

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.04,6) = CF(66) * A(2.01,6) * YN(5)$

VARIABLES ARE:

CF(66) = Annual modification factor
A(2.01,6) = Ammunition production cost
YN(5) = Number of operating years

CELL NO: A (3.04,7)
DATE: _____

COST DATA SHEET

ITEM: MODIFICATIONS, TRACKED VEHICLE OTHER

COST DATA EXPRESSION:

Cost = (Annual Modification Factor) x (Production Cost) x (Number of Operating Years)

INCLUDES: Modification work orders, retrofit, conversion, remanufacture, or engineering changes after acceptance by the Army.

EXCLUDES: Labor costs for above modifications and costs of program and product improvement offices (if any).

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.04,7) = CF(67) * A(2.01,7) * YN(5)$

VARIABLES ARE:

CF(67) = Annual modification factor

A(2.01,7) = Tracked vehicle other, production cost

YN(5) = Number of operating years

CELL NO: A (3.04,8)
DATE: _____

COST DATA SHEET

ITEM: MODIFICATIONS, PECULIAR SUPPORT EQUIPMENT

COST DATA EXPRESSION:

Cost = (Annual Modification Factor) x (Production Cost) x (Number of Operating Years)

INCLUDES: Modification work orders, retrofit, conversion, remanufacture, or engineering changes after acceptance by the Army.

EXCLUDES: Labor costs for above modifications and costs of program and product improvement offices (if any).

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.04,8) = CF(68) * A(2.01,8) * YN(5)$

VARIABLES ARE:

CF(68) = Annual modification factor

A(2.01,8) = Peculiar support equipment production cost

YN(5) = Number of operating years

CELL NO: A (3.04,9)

DATE: _____

COST DATA SHEET

ITEM: MODIFICATIONS, COMMON SUPPORT EQUIPMENT

COST DATA EXPRESSION:

Cost = (Annual Modification Factor) x (Production Cost) x (Number of Operating Years)

INCLUDES: Modification work orders, retrofit, conversion, remanufacture, or engineering changes after acceptance by the Army.

EXCLUDES: Labor costs for above modifications and costs of program and product improvement offices (if any).

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.04,9) = CF(69) * A(2.01,9) * YN(5)$

VARIABLES ARE:

CF(69) = Annual modification factor

A(2.01,9) = Common support equipment production cost

YN(5) = Number of operating years

CELL NO: A (3.05)
DATE:

COST DATA SHEET

ITEM: Other Direct Support Operations

COST DATA EXPRESSION:

Cost = Summation

INCLUDES: This element is the sum of Maintenance, Civilian Labor (3.051) and Other Direct Costs (3.052).

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.05) = A(3.051) + A(3.052)$

VARIABLES ARE:

CELL NO: A (3.051,10)
DATE: _____

COST DATA SHEET

ITEM: MAINTENANCE CIVILIAN LABOR - BATTALION RELATED

COST DATA EXPRESSION:

Cost = (Number of authorized operational equipment) x (Number of Civilian maintenance personnel per equipment) x (Average Annual cost per civilian maintenance personnel) x (Number of operating years) x (Shift factor)

INCLUDES:

Civilian labor costs below depot level.

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.051,10) = XN(190) * XN(220) * AC(210) * YN(5) * SF(7)$

VARIABLES ARE:

XN(190) = Total authorized quantity operational equipment
XN(220) = Number of civilian maintenance personnel per equipment
AC(210) = Average annual cost per civilian maintenance personnel
YN(5) = Number of operating years
SF(7) = Constant dollar shift factor, OMA

CELL NO: A (3.051.7)
DATE: _____

COST DATA SHEET

ITEM: MAINTENANCE, CIVILIAN LABOR - TRACKED VEHICLE SYSTEM RELATED

COST DATA EXPRESSION:

Cost = (Number of authorized operational equipment) x (Number of Civilian Maintenance personnel per equipment) x (Average annual cost per civilian maintenance personnel) x (Number of operating years) x (Shift factor)

INCLUDES:

Civilian labor costs below depot level

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

A(3.051,7) XN(187)*XN(217)*AC(207)*YN(5)*SF(7)

VARIABLES ARE:

XN(187) = Total authorized quantity operational equipment
XN(217) = Number of civilian maintenance personnel per equipment
AC(207) = Average annual cost per civilian maintenance personnel
YN(5) = Number of operating years
SF(7) = Constant dollar shift factor, OMA

CELL NO: A (3.052,7)
DATE: _____

COST DATA SHEET

ITEM: OTHER DIRECT, TRACKED VEHICLE SYSTEM RELATED

COST DATA EXPRESSION:

Cost = (Annual Other Direct Cost) x (Number of Operating Years) x (Shift Factor)

INCLUDES:

Unit operations,
PLL Repair parts,
Minor equipment, and
Organizational clothing and equipment

EXCLUDES:

POL for tracked vehicle system

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.052,7) = AC(217) * YN(5) * SF(7)$

VARIABLES ARE:

AC(217) = Annual other direct costs
YN(5) = Number of operating years
SF(7) = Constant dollar shift factor, OMA

CELL NO: A (3.052,10)

DATE: _____

COST DATA SHEET

ITEM: OTHER DIRECT, BATTALION RELATED

COST DATA EXPRESSION:

Cost = (Annual Other Direct Cost) x (Number of Operating Years) x (Shift Factor

INCLUDES: Unit operations, PLL repair parts, minor equipment, and organizational clothing and equipment.

EXCLUDES: POL for battalion

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.052,10) = AC(22) * YN(5) * SF(7)$

VARIABLES ARE:

AC(220) = Annual other direct costs

YN(5) = Number of operating years

SF(7) = Shift factor, OMA

CELL NO: A (3.06)
DATE: _____

COST DATA SHEET

ITEM: Indirect Support Operations

COST DATA EXPRESSION:

Cost = Summation

INCLUDES: This element is the sum of Personnel Replacement (3.061), Transients, Patients and Prisoners (3.062), Quarters, Maintenance and Utilities (3.063), Medical Support (3.064), and Other Indirect (3.065). It includes the costs of supplies, services and activities indirectly required to support the system.

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.06) = A(3.061) + A(3.062) + A(3.063) + A(3.064) + A(3.065)$

VARIABLES ARE:

CELL NO: A (3.061,7)

DATE: _____

COST DATA SHEET

ITEM: PERSONNEL REPLACEMENT, TRACKED VEHICLE SYSTEM RELATED

COST DATA EXPRESSION:

Cost = (Number of Authorized Operational Equipment) x (Number of Authorized Personnel per Equipment) x (Average Annual Attrition Rate) x (Average Replacement Cost per Man) x (Number of Operating Years) x (Constant Dollar Shift Factor, MPA)

INCLUDES:

MPA MOS Training (Basic and Advanced),
Recruiting Costs (Enlisted Personnel Only), and
Costs of In-Processing, Initial Outfitting and Separation Costs.

EXCLUDES: Enlistment and Re-enlistment Bonuses, Costs of Replacing Depot Maintenance and Medical Support Personnel and Costs of ROTC and USMA

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.061,7) = XN(187) * (XN(191) + XN(193) + XN(195)) * CF(73) * AC(221) * YN(5) * SF(8)$

VARIABLES ARE:

XN(187) = Total Authorized Quantity Operational Equipment
XN(191) = Number of Authorized Crewmen per Operational Equipment
XN(193) = Number Authorized Maintenance Men per Operational Equipment
CF(73) = Average Annual Attrition Rate
AC(221) = Average Replacement Cost per Man
YN(5) = Number of Operating Years
SF(8) = Constant Dollar Shift Factor, MPA
XN(195) = Number of Authorized Indirect Men per Operational Equipment

CELL NO: A (3.061,10)

DATE: _____

COST DATA SHEET

ITEM: PERSONNEL REPLACEMENT, BATTALION RELATED

COST DATA EXPRESSION:

Cost = (Number of Authorized Operational Equipment) x (Number of Authorized Personnel per Equipment) x (Average Annual Attrition Rate) x (Average Replacement Cost per Man) x (Number of Operational Years) x (Constant Dollar Shift Factor, MPA)

INCLUDES:

MPA MOS Training (Basic and Advanced),
Recruiting Costs (Enlisted Personnel Only) and
Costs of In-Processing, Initial Outfitting and Separation Costs

EXCLUDES: Enlistment and Re-enlistment Bonuses, Costs of Replacing Depot Maintenance and Medical Support Personnel and Costs of ROTC and USMA.

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.061,10) = XN(190) * XN(192) + XN(194) + XN(196)) * CF(74) * AC(222) * YN(5) * SF(8)$

VARIABLES ARE:

XN(190) = Total Authorized Quantity Operational Equipment
XN(196) = Number of Authorized Indirect Men per Operational Equipment
CF(74) = Average Annual Attrition Rate
AC(222) = Average Replacement Cost per Man
YN(5) = Number of Operating Years
SF(8) = Constant Dollar Shift, MPA
XN(192) = Number of Authorized Crewmen per Operational Equipment
XN(194) = Number of Authorized Maintenance Men per Operational Equipment

CELL NO: A (3.062,7)

DATE: _____

COST DATA SHEET

ITEM: TRANSIENTS, PATIENTS, AND PRISONERS, TRACKED VEHICLE SYSTEM RELATED

COST DATA EXPRESSION:

Cost = (TPP Factor) x (Authorized Crew, Maintenance, Indirect P&A Cost)

INCLUDES: TPP Costs for Crew and Maintenance Men (Including DS & GS) dedicated to Tracked Vehicle System

EXCLUDES: TPP Costs for Indirect Men within a Tracked Vehicle Battalion, DS & GS Maintenance Men for Common Support Equipment.

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.062,7) = CF(75) * (A(3.011,7) + A(3.012,7) + A(3.013,7))$

VARIABLES ARE:

CF(75) = TPP Factor

A (3.011,7) = Cost of Crew P&A

A (3.012,7) = Cost of Maintenance P&A

A (3.013,7) = Cost of Indirect P&A

CELL NO: A (3.062,10)

DATE: _____

COST DATA SHEET

ITEM: TRANSIENTS, PATIENTS, AND PRISONERS, BATTALION RELATED

COST DATA EXPRESSION:

Cost = (TPP Factor) x (Authorized Crew, Maintenance, Indirect P&A Cost)

INCLUDES: TPP costs for indirect men within a tracked vehicle battalion (or mixed force battalion) and DS, GS maintenance men for common support equipment.

EXCLUDES: TPP costs for direct men within a tracked vehicle battalion, DS and GS Maintenance men for common support equipment.

DATA SOURCE: _____

FINAL COST MODEL EXPRESSION:

$A(3.062,10) = CF(76) * (A(3.011,10) + A(3.012,10) + A(3.013,10))$

VARIABLES ARE:

CF(76) = TPP Factor

A(3.013,10) = Cost of Indirect P&A

A(3.011,10) = Cost of Crew P&A

A(3.012,10) = Cost of Maintenance P&A

CELL NO: A (3.063,7)
DATE: _____

COST DATA SHEET

ITEM: QUARTERS, MAINTENANCE, AND UTILITIES, TRACKED VEHICLE SYSTEM RELATED

COST DATA EXPRESSION:

Cost = (Total Quantity of Authorized Operational Equipment) x (Authorized Number Personnel per Equipment) x (Average Annual Quarters, Maintenance and Utilities Cost per Man) x (Number of Operating Years) x (Constant Dollar Shift Factor, OMA)

INCLUDES: The cost of maintenance and utilities for personnel living in government owned quarters - or the annual OMA cost of installation operations in support of force units

EXCLUDES:

DATA SOURCE

FINAL COST MODEL EXPRESSION:

$A(3.063,7) = XN(187) * (XN(191) + XN(193) + XN(195)) * AC(225) * UN(5) * SF(7)$

VARIABLES ARE:

XN(187) = Total Authorized Quantity Operational Equipment
XN(191) = Number of Authorized Crewmen per Operational Equipment
XN(193) = Number of Maintenance men Authorized per Operational Equipment
AC(225) = Average Annual Quarters, Maintenance and Utilities Cost per Man in Base Year Dollars
YN(5) = Number of Operating Years
SF(7) = Constant Dollar Shift Factor, OMA
XN(195) = Number of Indirect Men Authorized per Operational Equipment

CELL NO: A (3.063,10)

DATE: _____

COST DATA SHEET

ITEM: QUARTERS, MAINTENANCE, AND UTILITIES, BATTALION RELATED

COST DATA EXPRESSION:

Cost = (Total Quantity of Authorized Operational Equipment) x (Authorized Number Personnel per Equipment) x (Average Annual Quarters, Maintenance and Utilities Cost per Man) x (Number of Operating Years) x (Constant Dollar Shift Factor, OMA)

INCLUDES: The cost of maintenance and utilities for personnel living in government owned quarters - or the annual OMA cost of installation operations in support of force units.

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.063,10) = XN(190) * (XN(192) + XN(194) + XN(196)) * AC(226) * YR(5) * SF(7)$

VARIABLES ARE:

XN(190) = Total Authorized Quantity Operational Equipment
XN(196) = Authorized Number Indirect Personnel per Equipment
AC(226) = Average Annual Quarters, Maintenance and Utilities Cost per Man in Base Year Dollars
YR(5) = Number of Operating Years
SF(7) = Constant Dollar Shift Factor, OMA
XN(192) = Authorized Number Crewmen per Equipment
XN(194) = Authorized Number Maintenance Personnel per Equipment

CELL NO: A (3.064,7)

DATE: _____

COST DATA SHEET

ITEM: MEDICAL SUPPORT, TRACKED VEHICLE SYSTEM RELATED

COST DATA EXPRESSION:

Cost = (Number of Authorized Operational Equipment) x (Number of Authorized Personnel per Equipment) x (Average Annual Medical Support Cost per Man) x (Number of Operating Years) x (Constant Dollar Shift Factor, MPA)

INCLUDES: OMA - Variable Cost of Medical and Dental Support which can be related to Military Personnel of the Force Unit (Battalion).

EXCLUDES: Cost of Support Rendered to Cadets, Retired Personnel and Dependents and the cost of Medical Research and other Medical Overhead Activities.

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.064,7) = XN(187) * (XN(191) + XN(193) + XN(195)) * AC(229) * YN(5) * SF(8)$

VARIABLES ARE:

XN(187) = Total Authorized Quantity Operational Equipment
XN(191) = Number Authorized Crewmen per Operational Equipment
XN(193) = Number of Authorized Maintenance Men per Operational Equipment
AC(229) = Average Annual Medical Support Cost per Man
YN(5) = Number of Operating Years
SF(8) = Constant Dollar Shift Factor, MPA
XN(195) = Number of Authorized Indirect Men per Operational Equipment

CELL NO: A (3.065,7)
DATE: _____

COST DATA SHEET

ITEM: OTHER INDIRECT TRACKED VEHICLE SYSTEM RELATED

COST DATA EXPRESSION:

Cost = (Annual Other Indirect Cost) x (Number of Operating Years) x
(Constant Dollar Shift Factor, OMA)

INCLUDES: Costs of Project Management Office, Product Improvement Office;
Theatre costs for Operation of Schools for Dependents; Special Transportation
Costs and Costs of General Supplies to Force Units which exist solely
because of the System being Costed.

EXCLUDES: Indirect included elsewhere

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.065,7) = AC(237) * YN(5) * SF(7)$

VARIABLES ARE:

AC(237) = Annual other Indirect Cost
YN(5) = Number of Operating Years
SF(7) = Constant Dollar Shift Factor, OMA

CELL NO: A (3.065,10)

DATE: _____

COST DATA SHEET

ITEM: OTHER INDIRECT, BATTALION RELATED

COST DATA EXPRESSION:

Cost = (Annual Other Indirect Cost) x (Number of Operating Years) x
(Constant Dollar Shift Factor, OMA)

INCLUDES: Variable costs related to force unit supplies consumed per man year, including second destination transportation, and the variable portion of procurement operations, supply depot management and past operations. Operation of schools for dependents, administrative and associated activities costs which vary with strength changed.

EXCLUDES:

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.065,10) = AC(240) * YN(5) * SF(7)$

VARIABLES ARE:

AC(240) = Annual other Indirect Cost
YN(5) = Number of Operating Years
SF(7) = Constant Dollar Shift Factor , OMA

CELL NO: A (3.064,10)

DATE: _____

COST DATA SHEET

ITEM: MEDICAL SUPPORT, BATTALION RELATED

COST DATA EXPRESSION:

Cost = (Number of Authorized Operational Equipment) x (Number of Authorized Personnel per Equipment) x (Average Annual Medical Support Cost per Man) x (Number of Operating Years) x (Constant Dollar Shift Factor, MPA)

INCLUDES: OMA - Variable Cost of Medical and Dental Support which can be related to Military Personnel of the Force Unit (Battalion).

EXCLUDES: Cost of Support Rendered to Cadets, Retired Personnel and Dependents and the cost of Medical Research and other Medical Overhead Activities.

DATA SOURCE:

FINAL COST MODEL EXPRESSION:

$A(3.064,10) = XN(190) * (XN(192) + XN(194) + XN(196)) * AC(230) * YN(5) * SF(7)$

VARIABLES ARE:

XN(190) = Total Authorized Quantity Operational Equipment
XN(196) = Authorized Number Indirect Personnel per Equipment
AC(230) = Average Annual Medical Support Cost per Man
YN(5) = Number of Operating Years
SF(8) = Constant Dollar Shift Factor, MPA
XN(192) = Authorized Number Crewmen per Equipment
XN(194) = Authorized Number Maintenance Men per Equipment

APPENDIX 2

REFERENCES

1. AR 11-18, The Cost Analysis Program, 10 October 1975.
2. DA Pamphlet 11-2, Research and Development Cost Guide for Army Materiel Systems, 1 May 1976.
3. DA Pamphlet 11-3, Investment Cost Guide for Army Materiel Systems, 12 April 1976.
4. DA Pamphlet 11-4, Operating and Support Cost Guide for Army Materiel Systems, 1 April 1976.
5. DA Pamphlet 11-5, Standards for Presentation and Documentation of Life Cycle Cost Estimates for Army Materiel Systems, 3 May 1976.
6. Army Life Cycle Cost Model, Office of the Comptroller of the Army, Directorate of Cost Analysis (DCA-R-15), Volume I, User's Guide and Volume II, Programmer's Guide, January 1976.
7. Army Force Planning Cost Handbook, Office of the Comptroller of the Army, Directorate of Cost Analysis, June 1975.